THE LANCET.

A Journal of British and Foreign Medicine, Surgery, Obstetrics, Physiology, Chemistry, Pharmacology, Public Health, and News.

TELEGRAPHIC ADDRESS—LANCET, WESTRAND LONDON TELEPHONE NUMBER—GERRARD 5356

No. XV. OF VOL. I., 1917.
No. 4885. Vol. CXCII. LONDON, SATURDAY, APRIL 14, 1917. Price 8d.

BY FRANK KIDD, F.R.C.S.,
Assistant Surgeon at the London Hospital, and Surgeon-in-Charge of Genito-Urinary Department, London Hospital.

JUST PUBLISHED. Price 5s. net.

"COMMON DISEASES OF THE MALE URETHRA."

Being a Course of Lectures delivered at the London Hospital, designed to assist those who may be starting Genito-Urinary Clinics. With numerous Illustrations and Appendices.

By the same Author.

URINARY SURGERY: A REVIEW. 7s. 6d. net.

"This book can be thoroughly recommended by those who are desirous of being acquainted with modern position of urinary surgery." —GLASGOW MEDICAL JOURNAL.

London: Longmans, Green & Co., 39, Paternoster Row, E.C. 4.

Price 15s. net. Post free (inland) 15s. 7d.

SQUIRE'S COMPANION to the BRITISH PHARMACOPŒIA.

An exhaustive Review of over Half a Century's Progress in THERAPEUTICS, CHEMISTRY, and PHARMACEUTICS.

Published by J. & A. Churchill, 7, Great Marlborough-street, W. 1.

OPERATIVE TREATMENT OF FRACTURES.

By Sir ARBUTHNOT LANE, Bart., M.S.

SECOND EDITION.

With 226 Illustrations. 10s.

The Medical Publishing Company, Ltd., 23, Bartholomew Close, E.C.

Now Ready. Crown octavo. 56 pp. Illus. Price 1s. net; by post 1s. 2d.

NOTES ON MILITARY ORTHOPÆDICS.
By PAUL BERNARD ROTH, F.R.C.S "Should be in the hands of every surgeon on active service."—MEDICAL WORLD.
Henry Kimpton, 263, High Holborn, London, W.C.

FREYER'S ENLARGEMENT of the PROSTATE. With a Description of the Author's Operation of Total Enucleation of the Organ. A Work based on 800 Cases of the Operation. THIRD EDITION. With 54 Illustrations. Price 6s. net.
SURGICAL DISEASES OF THE URINARY ORGANS. With 141 Illustrations. Price 12s. 6d. net.
Baillière, Tindall & Cox, 8, Henrietta-street, Covent Garden, London.

8vo, 12s. 6d. net. Stereoscope, 2s. 6d. net.

RHINOLOGY: A TEXT-BOOK OF THE DISEASES OF THE NOSE AND ACCESSORY SINUSES.
47 Plates and 146 Illustrations.
By P. WATSON-WILLIAMS, M.D. Lond.,
Lecturer on Diseases of Ear, Nose, and Throat, University of Bristol, and in Charge of Ear, Nose, and Throat Department, Bristol Royal Infirmary.
Longmans, Green & Co., 39, Paternoster-row, London, E.C.

ON GROWTH AND FORM

By

D'ARCY WENTWORTH THOMPSON

Demy 8vo, pp. xvi + 794. With 408 figures. Price 21s net

Prospectus on application

Cambridge University Press, Fetter Lane, London. C. F. Clay, Manager

BONESETTING and the TREATMENT of PAINFUL JOINTS.

By FRANK ROMER, M.R.C.S., L.R.C.P., and L. ELIOT CREASY, M.R.C.S., L.R.C.P.

Crown 8vo, 1s. net.

"Messrs. Romer & Creasy strip this branch of practice of the cloud of mystery and miracle which has been thrown around it by interested people and well-meaning, but ignorant supporters. They effectually disprove the foolish charge that the medical profession has wilfully ignored the subject, and they have dealt with it in an unprejudiced spirit. Moreover, they bear witness to the fact that the profession keeps an open mind as to everything connected with the treatment of disease and the relief of pain and physical disability, and is willing to learn from any source anything that may seem likely to be useful for these purposes."—BRITISH MEDICAL JOURNAL.

James Nisbet & Co., Limited, 22, Berners-street, W.

BY P. LOCKHART-MUMMERY, F.R.C.S.

DISEASES OF THE COLON AND THEIR SURGICAL TREATMENT.

Numerous Illustrations and Coloured Plates. 10s. net.

Baillière, Tindall & Cox, 8, Henrietta-street, Covent Garden.

By H. BELLAMY GARDNER, M.R.C.S., L.R.C.P. Lond.

A MANUAL OF SURGICAL ANÆSTHESIA
Second Edition. Price 7s. 6d. 215 pages, 46 Illus., 8 Plates.
"A concise and well-written handbook."—EDIN. MED. JOURN.
London: Baillière, Tindall & Cox, 8, Henrietta-street, Covent Garden.

JUST PUBLISHED. Second Edition. With 22 Illustrations. Demy 8vo. 7s. 6d. net; post free, 7s. 11d.; abroad, 8s. 2d.

THE CAUSATION OF SEX IN MAN. A NEW THEORY OF SEX BASED ON CLINICAL MATERIALS

Together with Chapters on Forecasting or Predicting the Sex of the Unborn Child, and on the Determination or Production of either Sex at Will.

By E. RUMLEY DAWSON, L.R.C.P. Lond., M.R.C.S. Eng., formerly Member of the Council of the Obstetrical Society of London, and Fellow of the Royal Society of Medicine.

NOW READY. THIRD Edition. Revised and Enlarged. 2 Plates. Crown 8vo 6s net; post free, 6s. 5d.

THE SEXUAL DISABILITIES OF MAN AND THEIR TREATMENT AND PREVENTION.

By ARTHUR COOPER, M.R.C.S., L.R.C.P., Consulting Surgeon, Westminster Gen. Disp.; formerly House Surgeon, Male Lock Hospital, &c.

"A sound and trustworthy account of sexual disabilities in the male and their treatment."—BRITISH MEDICAL JOURNAL.

Demy 8vo. With 126 Illustrations (3 in colours) from original drawings and photographs. 10s. 6d. net; post free, 10s. 11d., abroad, 11s. 2d.

THE PATHOLOGY OF TUMOURS.

By E. H. KETTLE M.D., B.S., Assistant Pathologist, St. Mary's Hospital, and Assistant Lecturer on Pathology, St. Mary's Hospital Medical School, &c.

"We have every confidence in recommending Dr. Kettle's work as a convenient and useful handbook for the practitioner and the student." —THE LANCET.

See also Advertisement page 3.

London: H. K. LEWIS & CO. LTD., 136 Gower Street, W.C. 1.

 THE LANCET is registered as a Newspaper. All rights reserved.

By Royal Warrant
To H.M. King George V. To H.M. Queen Alexandra.

Holders of Royal Warrants during three successive Reigns.

Jeyes' Fluid—Best and Safest Disinfectant.

Cyllin—**Jeyes' Special Fluid.** The relatively non-poisonous Bactericide.

Cyllin Medical—A refined preparation of Cyllin.

Jeysol—Identical in composition with original German Lysol, and equally efficient.

Jeyes' Parasitic Soap—For destroying all body parasites in the trenches.

Jeves' "Cyllin" Toilet Soap—Invaluable for promoting a healthy skin.

Cyllin Throat Pastilles } Antiseptic.—For all
" " **Lozenges** } Throat Affections.

Jeyes' Sanitary Compounds Co., Ltd., 64, Cannon Street, London, E.C. 4.

PHYSIOLOGICALLY TESTED DRUGS.

Owing to the absence of any adequate Chemical tests for certain very important Drugs, notably **ERGOT, CANNABIS INDICA, CONVALLARIA, MAJALIS, DIGITALIS, SQUILL,** and **STROPHANTHUS,** we are submitting these for physiological examination by one of the first experts in the Country, and can guarantee our preparations of them to be of

FULL THERAPEUTIC ACTIVITY.

WILLOWS, FRANCIS, BUTLER & THOMPSON, Limited,
Wholesale Druggists,
40, ALDERSGATE STREET, LONDON, E.C.

Telegrams—"FORTY, LONDON."
Telephone—3618 } CITY. 3619 }

THE LANCET.

No. 4885. LONDON, SATURDAY, APRIL 14, 1917. Vol. CXCII.

CONTENTS.

The whole of the literary matter in THE LANCET is copyright.

THE LETTSOMIAN LECTURES on War Surgery of the Abdomen. Delivered before the Medical Society of London by CUTHBERT WALLACE, B.S. Lond., F.R.C.S.Eng., C.M.G., Surgeon to St. Thomas's Hospital; Consulting Surgeon, British Expeditionary Force. —Lecture I.—(*Illustrated*) 561

ORIGINAL ARTICLES.

The Importance of the Diagnosis of Enteric Fevers by Agglutinin Determinations. By E. W. AINLEY WALKER, M.A., D.M. Oxon., Captain, O.T.C. Univ. Oxon.; Fellow and Tutor of University College, and Lecturer in Pathology in the University of Oxford. (Report to the Medical Research Committee.) 568

An Easy and Rapid Method of Detecting Protozoal Cysts in Fæces by Means of Wet-stained Preparations. By ROBERT DONALDSON, M.A., M.B. Edin., F.R.C.S. Edin., D.P.H., Bacteriological Specialist, War Hospitals, Reading; Pathologist, Royal Berkshire Hospital, Reading, &c. 571

Toxic Symptoms after the Use of Bismuth Paste. By F. A. HEPWORTH, F.R.C.S. Eng., Temp. Major, R.A.M.C.; Chief Resident Surgeon, Wharncliffe War Hospital, Sheffield 573

The Relation of Structure to Function as seen in a Mechanism of the Venous System. By F. WOOD JONES, D.Sc., M.B., B.S.Lond., Professor of Anatomy, London School of Medicine for Women.—(*Illustrated*) 574

A Note on the Immediate After-treatment of the Guillotine Amputation Stump, and the Prevention of Secondary Hæmorrhage. By H. F. WOOLFENDEN, F.R.C.S. Eng., Captain, R.A.M.C.(T.C.); and J. CAMPBELL, M.D.Liverp., Captain, R.A.M.C. (S.R.).—(*Illustrated*) 576

MEDICAL SOCIETIES.

MEDICAL SOCIETY OF LONDON: Traumatic and Arterio-venous Aneurysms 576

NEW INVENTIONS.

A New Tourniquet (Captain Joseph E. Adams, R.A.M.C.(T.)).—(*Illustrated*) 578

A Splint for the Wrist-drop of Radial Nerve Paralysis.—(*Illustrated*) 578

LEADING ARTICLES.

THE HEALTH OF THE PEOPLE... 579

"SOLDIER'S HEART." 580

ANNOTATIONS.

Child Mortality 581

The Nature and Function of Eosinophile Cells 582

Sprue 582

Hospital Treatment for Poor-law Patients in Ireland 583

The Etiology of Hæmorrhagic Retinitis 583

Successful Operation for a Bullet Lodged in the Wall of the Left Ventricle 583

The Special School Code 584

Malaria in Trinidad 584

Certifying Surgeons and Compensation for Loss of Income 585

SPECIAL ARTICLES.

Ireland: The Health of Belfast. —The Belfast Ophthalmic Hospital. — Hilden Convalescent Hospital, Belfast.—Maternity and Child Welfare 585

The Services: Royal Naval Medical Service.—Army Medical Service. — Royal Army Medical Corps.—Indian Medical Service 587

PUBLIC HEALTH.

Reports of School Medical Officers 586

URBAN VITAL STATISTICS:

English and Welsh Towns 587

Scotch Towns 587

Irish Towns 587

CORRESPONDENCE.

"Soldier's Heart" (Dr. Theodore Fisher, Dr. Alexander Morison) 588

The Lumleian Lectures on Heart Disease (Dr. F. John Poynton) 589

The Examination of the Blood of Typhus Fever Cases by Dark-ground Illumination (Dr. W. James Wilson, Dr. Georgina R. Darling) 589

The Closure of Colotomy Openings (Mr. Ernest Finch) 590

Tuberculosis and the War (Dr. Henry A. Hillis) 590

Reading by Ear (Sir Arthur Pearson) 590

Drugging by a Dentist (Mr. W. Gilchrist Burnie) 594

THE WAR.

The Casualty List 591

Deaths among the Sons of Medical Men 591

Mentioned for War Services 591

The Central Medical War Committee: the Supply of Medical Officers for the Army 591

The Medical Service of the United States Navy 591

Medical Arrangements in Volunteer Battalions 591

The Army Doctor's Risks 592

MEDICAL NEWS.

Royal Victoria Hospital, Belfast 573

The late Mr. Leonard George Boor 581

The Cancer Hospital 581

Centenarian 585

Examining Board in England by the Royal Colleges of Physicians of London and Surgeons of England: Pass-list 592

University of London: Pass-list 592

University of Durham: Faculty of Medicine: Degrees, &c., conferred 592

Royal College of Physicians of London 592

Royal Institute of Public Health 592

Metropolitan Asylums Board: Diploma in Public Health 593

Institute of Hygiene 593

Appointments.—Vacancies 593

Births, Marriages, and Deaths.. 593

Notes, Short Comments, and Answers to Correspondents ... 594

Medical Diary 595

Editorial Notices 595

Manager's Notices 595

Meteorological Readings 595

Books, &c., received 596

Acknowledgment of Communications received 596

FOR INDEX TO ADVERTISEMENTS SEE PAGE 2.

JOHN BALE, SONS & DANIELSSON, LTD.,

PRINTERS, PUBLISHERS, & PROCESS BLOCK MAKERS.

HOW TO CUT THE DRUG BILL or the Prescriber's Vade-Mecum.
By A. HERBERT HART, M.S., M.D. THIRD EDITION. Crown 8vo. Cloth. 2s. 6d. net; postage 3d.

FIELD SERVICE NOTES FOR R.A.M.C., including Alterations and Amendments.
By MAJOR GOODWIN. 3s. net; postage 2d.

LOCAL ANÆSTHESIA: An Illustrated Text-Book for Students and Practitioners. Translated by RONALD E. S. KROHN. 2nd Impression. Royal octavo. Pp. 193. 8s. 6d. net; postage 6d.

THOMPSON'S COMPENDIUM of the Pharmacopœias and Formularies (Official and Unofficial). FIFTH EDITION. Completely Revised. 5s. 4d. net; post free.

83, 85, 87, 89 & 91, GREAT TITCHFIELD ST., OXFORD ST., LONDON, W. 1.

INDEX

MEDICAL AND OTHER BOOKS AND PUBLICATIONS

PAGE

BAILLIERE, TINDALL & COX:—
Freyer—Enlargement of the Prostate ..... Cover 1
Freyer—Surgical Diseases of the Urinary Organs ..... Cover 1
Gardner—Manual of Surgical Anæsthesia ..... Cover 1
Lockhart-Mummery—Diseases of the Colon and their Surgical Treatment ..... Cover 1

BALE, SONS & DANIELSSON:—
Goodwin—Field Service Notes for R.A.M.C. 1
Hart—How to Cut the Drug Bill 1
Local Anæsthesia 1
Thompson's Compendium of the Pharmacopœias and Formularies 1

CAMBRIDGE UNIVERSITY PRESS:
Thompson—On Growth and Form Cover 1

PAGE

CHURCHILL, J. & A.:—
Squire's Companion to the British Pharmacopœia ..... Cover 1
Thorne, Begly—Schott Methods of Treatment of Chronic Diseases of the Heart 4

DANIEL:—
Rabagliati—Initis or Nutrition and Exercises 4

FROWDE AND HODDER & STOUGHTON:—
Waring—Surgical Diseases of the Gall Bladder, Bile Ducts, and Liver 4
Waring—Manual of Operative Surgery 4

KIMPTON:—
Roth—Notes on Military Orthopædics ..... Cover 1

LEWIS & CO:—
Binnie—Manual of Operative Surgery 3

PAGE

LEWIS & CO.—(Continued).
Burnham—Hæmocytes & Hæmic Infections 3
Buxton—Anæsthetics 3
Carter—Elements of Practical Medicine 3
Cooper—Sexual Disabilities of Man ..... Cover 1
Dawson—The Causation of Sex in Man ..... Cover 1
Emery—Clinical Bacteriology and Hæmatology for Practitioners 3
Hellman—Amnesia and Analgesia in Parturition 3
Kenwood—Public Health Laboratory Work 3
Kettle—Pathology of Tumours Cover 1
Lewers—The Diseases of Women. 3
Medical Books 4
Scientific Books 4
Swanzy's Handbook of Diseases of the Eye and their Treatment .. 3
White—Occupational Affections of the Skin 3

PAGE

LONGMANS, GREEN & CO.:—
Kidd—Common Diseases of the Male Urethra ..... Cover 1
Kidd—Urinary Surgery .... " 1
Watson-Williams—Rhinology Cover 1

MEDICAL PUBLISHING CO.:—
Lane, Sir A.—Operative Treatment of Fractures ..... Cover 1

NISBET & CO.:—
Romer and Creasy—Bonesetting, &c. ..... Cover 1

WRIGHT & SONS (BRISTOL):—
Index of Differential Diagnosis of Main Symptoms 5

MEDICAL LIBRARIES, &c.:—
Baker—Books 4
Behnke—Stammering, &c. 4
Ketley—Stammering 4
Lewis & Co.'s Medical and Scientific Circulating Library 4
Matthews—Wood: Application of Trusses to Hernia 4

OFFICIAL AND GENERAL ANNOUNCEMENTS

ASSISTANCIES, MEDICAL .. 53, 54

ASYLUMS, HOMES, &c.:—
Ashwood House, Kingswinford .. 47
Barnwood House Hospital 48
Bishopstone House, Bedford 47
Brunton House, Lancaster 47
Camberwell House, Peckham-road 50
Cheadle Royal 48
Clarence Lodge, Clapham Park .. 47
Colthurst House School, Alderley Edge 47
Co-operative Sanatorium, Billericay 52
Coppice, The, Nottingham 48
Court Hall, Kenton, near Exeter. 51
Dalrymple House, Rickmansworth 50
David Lewis Colony, Alderley Edge 47
Duff House, Banff 51
General Manager, Craven street. 51
Ghyllwoods Sanatorium 50
Grove House, Church Stretton .. 48
Grove, The, Catton, Norwich 49
Haslemere Nursing Home 51
Haydock Lodge, Newton-le-Willows 49
Heigham Hall, Norwich 48
Homes for Inebriate Women 50
Hove, Sussex 51
Littleton Hall, Brentwood 51
London Fever Hospital 48
Mailing Place, Kent 48
Melbourne House, Leicester 50
Mendip Hills Sanatorium 50
Moat House, Tamworth 48
Newmains Retreat, Lanarkshire.. 50

ASYLUMS—(Continued).
New Saughton Hall, Polton, Midlothian 49
Nordrach-on-Dee, Banchory 51
Northumberland House, Finsbury Park 49
Northwoods House, Winterbourne 49
Otto House, West Kensington 47
Peckham House 49
Pendyffryn Hall Sanatorium, Nordrach-in Wales 50
Plympton House, Plympton 48
Portsmouth Corporation Mental Hospital 47
Royal Earlswood Institution for Mental Defectives 49
St. Andrew's Hospital, Northampton 48
St. George's Retreat, Burgess Hill 47
Springfield House Private Asylum, Bedford 47
Stretton House, Church Stretton. 48
The Grange, near Rotherham 48
Vale of Clwyd Sanatorium 50
Warneford Asylum, Oxford 47
Westholme, Torquay 51
Wye House, Buxton 48

FINANCIAL, &c.:—
Equitable Reversionary Interest Society 45

HEALTH RESORTS, BATHS, &c.:—
Alexandra Therapeutic Institute. 47
Caterham Sanitarium 51
Droitwich Brine Baths 51
Smedley's, Matlock 51

HOMES WANTED:—
No. 326, L.O., Strand 51

HOSPITAL, INFIRMARY, SANATORIUM, &c., VACANCIES. 52-53

HOUSE & ESTATE AGENTS 54

LIFE & FIRE ASSURANCES, &c.:—
General Life Assurance Co. 45
Medical Sickness & Accident Soc. 36
National Provident Institution .. 45
Prudential 45

MASSAGE:—
Associated Male Nurses and Masseurs 45

MEDICAL ACCOUNTANTS, &c.:—
Turner 54

MEDICAL AGENTS 55

MEDICAL SCHOOLS—
(LONDON.)
London School of Clinical Med. .. 44
St. Mary's Hos. Medical School .. 44
West London Post-Graduate College 44
(PROVINCIAL, &c.)
University of Birmingham 44

NURSES' ASSOCIATIONS:—
Co-operation of Temperance Male and Female Nurses 46
Female Nurses Association 48
General Nursing Association 48
Hospital for Sick Children 48

NURSES' ASSOC. (Continued).
London Nurses' Association 48
London Temperance Nurses Co-operation 47
Male Nurses Temperance Co-operation 48
Mental Nurses Association 45
Mental Nurses' Co-operation 48
Nurses' Association 45
Nurses' Co-operation 47
St. John's House 48
St. Luke's Hospital 48
Temperance Association of Male Nurses, Ltd. 48
The Retreat, York 45

OFFICIAL NOTICES:—
City of London Lying-in Hospital. 44
Epsom College 44
Guy's Hospital 44
Institute of Massage and Remedial Gymnastics 44
London Hospital Medical College 44
London School of Tropical Medicine 45
Queen Charlotte's Lying-in Hospital 44
Royal College of Surgeons of England 44
Royal Institute of Public Health 44

PARTNERSHIPS & PRACTICES. 54

TUTORS & LECTURERS:—
Behnke 45
Medical Correspondence College. 45
Weymouth 45

TRADE AND MISCELLANEOUS ADVERTISEMENTS

AMBULANCES:—
Daimler Company—Motor Ambulances for hire 7
St. John Ambulance—Invalid Carriages 8

BOTTLE MERCHANTS:—
Isaacs 41

CARRIAGES, MOTORS, &c.:—
Armstrong—Liveries 55
Beldam Tyre Co.—Beldam Tyres.. 6
Brown Brothers—Duco Spring Gaiters 6
Keele, Ltd.—Motor Cars Repaired 6
Ware & De Freville—Motor Cars.. 6

CHEMISTS & DRUGGISTS:—
Allen & Hanburys—Bynin Amara 25
Chrismol and its Preparations .. 24
Anglo-French Drug Co.—Cryogenine, Galyl 30
Antiphogistine 16
Battley & Watts—Liquor Opii Sedativus 9
Boots Pure Drug Co.—Aspirin Compressed Tablets, &c. 35
Bristol-Myers Co.—Sal Hepatica.. 35
British Drug Houses Ltd.—Intramine 23
British Oxygen Co.—Oxygen 41
Browning & Co.—Semprolin Emulsion with Iron 29
Burroughs Wellcome & Co.—Soloid Brand Antiseptics 26
Tabloid Brand Hypodermic Products 27
Carnrick (G. W.) Co.—Hormotone ..... Cover iv
Christy & Co.—
Glyco-Thymoline 20
Ergoapiol 38
Crookes' Laboratories—Collosols 8
Etablissements Poulenc Freres—Stovaine 11
Fellows Medical Manfg. Co.—Fellows' Syrup 11

CHEMISTS—(Continued).
Gale & Co.—Elixir Cresolis c. Heroin Co., &c. 29
Genatosan, Ltd.—Cystopurin 14
Haller—Maltose 39
Heppells—Urodonal 15
Hewlett & Son—Mist. Pepsinæ Co c. Bismutho 41
Hoffmann La Roche Chemical Works—Digalen 18
Hough, Hoseason & Co.—Hydrion 39
Lambert Pharmacal Co.—Listerine 32
May & Baker—Bactopeptone 9
Moore & Co., Ltd.—Lymm-Pure-Salt 41
Newbery & Sons—Pulvis Jacobi Ver. 41
New York Pharmaceutical Co.—Hayden's Viburnum Compound 32
Parke, Davis & Co.—Cascara Evacuant 21
Raimes & Co.—Slinger's Nutrient Suppositories 41
Richards & Sons—Antikamnia Tablets 8
" & Codeine Tablets. 8
Saccharin Corporation, Ltd.—Dial-Ciba, Lipiodine-Ciba, Digifolin 17
Smith & Co.—Hall's Wine 38
Southall Bros. & Barclay—Aldemine, Cystoformin, &c. 10
S. P. Charges Co.—Sulphaqua.... 38
Squire & Sons—Terperoin, Corisol and Cinnamal Comps. 22
Wilcox, Jozeau & Co.—Kola Astier 39
Willows, Francis, Butler & Thompson—Physiologically Tested Drugs ..... Cover ii

DISINFECTANTS:—
Condy's Fluid 6
Jeyes' Sanitary Compounds Co.—Jeyes' Fluid, &c. ..... Cover ii

FOODS:—
Benger's Food 12
Blatchley's Diabetic Preparations Cover iii
Brand & Co.—Essence of Beef 40
Cadbury's Cocoa 29
Callard & Co.—Diabetic Foods .. 40
Carnrick & Co.—Dry Peptonoids. 28
Chymol Company—Chymol 31
Fairchild Bros. & Foster—Panopepton 19
Freemans Devonshire Custard.... 40
Frys Malted Cocoa ..... Cover iii
Manhu Food Co.—Manhu Diabetic Foods 40
Pan Yan Pickle 40
Valentine's Meat-Juice .. Cover iii
Wander, Ltd.—Ovaltine 15

FURNITURE, &c.:—
Carters—Furniture for Invalids and Hospital Supplies 34

HOSPITALS (ISOLATION):—
Humphreys, Limited—Mobile Hospital Buildings, &c.. 37

MED. & SURG. APPLIANCES:—
Arnold & Sons—New Patent Phonophore Stethoscopes 56
Bailey & Son—Patent Abdominal Belts..... 35
Davis—Lukens Sterile Catgut with Dulox Needle..... 43
Davis & Geck—Sutures fit for Surgery 4
Holland—Patent Instep Supports 42
Hough, Hoseason & Co.—New Century Urethral Syringe. 39
Millikin & Lawley—Osteology, &c. 42
Precious Metals Tempering Co.—Tempered Gold Hypodermic Needles 43
Robinson & Sons—Gamgee Tissue 42
St. Dalmas & Co.—Leicester Varico Leg Bandage.. 56
Timpson & Co.—Canthos Blister Plaster 43

MED. APPLIANCES—(Continued).
Wright, Ltd.—Household Medical Battery 5
Zeal—Repello Clinical Thermometer 42

MINERAL WATERS, &c.:—
Hogg & Son—Lithia Waters 40
Vichy-Célestins 36

OPTICIANS:—
Bausch & Lomb Optical Co.—Microscope 5
Watson & Sons, Ltd.—Microscopes 41

SANITARY APPLIANCES, &c.:—
Berkefeld Filter 55
Slack & Brownlow—Brownlow Filter 34

STATIONERY, &c.:—
Anderson & Son—Doctors' A/c Forms, &c. 55
Mabie, Todd & Co.—Swan Fountpens 43
Venus Pencils 42

TAILORS, BOOTMAKERS, &c.:—
Burberrys—The Burberry 35
Harry Hall—Service Dress..... 55

VACCINE LYMPH:—
Burgoyne, Burbidges & Co., Ltd.—Pure and Reliable Glycerinated Calf Lymph 5
Chaumier's Calf Lymph 5
Jenner Institute for Calf Lymph 5

WINES, BEER, SPIRITS, &c.:—
Wood, Campbell & Co.—Touraine and Anjou Wines 7

X-RAY, &c., APPARATUS:—
Medical Supply Association—The Galvanoset 42

MISCELLANEOUS:—
Box 52, Colonial Advertising Co.—Secretary 54

The Lettsomian Lectures
ON
WAR SURGERY OF THE ABDOMEN.

Delivered before the Medical Society of London

BY CUTHBERT WALLACE, B.S. LOND., F.R.C.S. ENG., C.M.G.,

SURGEON TO ST. THOMAS'S HOSPITAL; CONSULTING SURGEON, BRITISH EXPEDITIONARY FORCE.

LECTURE I.

Delivered on March 19th, 1917.

FOREWORD.

MR. PRESIDENT AND GENTLEMEN,—I have entitled these lectures "War Surgery of the Abdomen," but it may be asked if there is really such a thing as war surgery as distinct from civil surgery. I am inclined to think that there is very little difference. What actual difference there is lies in the anatomical nature of the injuries, such injuries perhaps being influenced in some degree by the high speed of the projectile, though this has, it seems to me, been very much over-emphasised.

Good surgical principles apply as much in war as in peace and should govern all our treatment if we wish for good results. War surgery is really largely concerned with overcoming what, in civil life, one would call "adverse circumstances," and in striving to make war conditions as much like peace conditions as is possible. It is in great degree a matter of when and where to operate and how best to move the wounded man to the place where he will win back to health.

There has been, and I daresay there always will be, some difference of opinion between the medical and military branches. The surgeon wants to start treatment as soon as possible and to keep his patient quiet; the soldier is mostly concerned, and rightly, to clear the fighting area of the sick and wounded. There are some surgeons who are too surgical and some combatants who are too combatant. The result, of course, is a compromise. A happy sign is the passing away of the old shibboleth, "You cannot do this—we are at war." I should say in no previous war has the medical man had it so much his own way. There is a sympathy and trust between the combatant and the medical branches which was not present in South Africa. The old-style staff officer, who cursed the ambulances at one time for being in the way—and soon after for being out of the way—is defunct.

The Medical Service in its present campaign is without exaggeration a wonderful organisation. It shows signs of strong life, for it continues to improve. So good is it that we must continue to strive in every way to make it better and better; we must use every means to improve mobility and to save labour, and adapt ourselves to the ever-changing conditions of war.

UTILITY OF FORMER EXPERIENCE.

Of this I am somewhat doubtful. It is in some ways as much a hindrance as a help. In judging of the number of the wounded; the proportion of killed to wounded; the accommodation required, it seems to have been a help as such things alter but little, though they are altering; but as a general guide to surgery it has been, if anything, somewhat of a handicap.

In South Africa one learnt to treat many wounds with little respect. One allowed wounds received under non-surgical conditions to scab over, and many became confirmed in their opinion that rest, starvation, and morphia was the right treatment in abdominal wounds.

This war has proved that good surgical principles will assert themselves—that the dirty wound must be laid open and that a penetrating abdominal wound must be explored.

The changing conditions of wars seem to show that surgical histories brought out after the war are largely a labour lost and a waste of time. Every effort must be made to summarise and render accessible the experiences of the early months of a war for use in its later periods. This has been done in the present campaign by both combatant and medical services. The Army is full of schools where by lectures and demonstrations officers and men are taught new methods of warfare. Although from the nature of things the same methods are not applicable in the Medical Services, a great deal has been done to spread knowledge.

The Army Medical Department has issued pamphlets on various subjects wherein the experience gained has been put at the disposal of all the officers attached to the Army. There is also the Medical Research Committee, whose arrangements for the interchange of knowledge by post-cards, and reports which tell of the progress of cases as they pass from one unit to another, have been of the utmost value. I should like to take this opportunity of asking those into whose hands such inquiries come to use their utmost power to supply the details asked for. By such means treatment has been modified and improved with the knowledge gained.

A series of well-observed cases while the war is in progress is worth pages of statistics when the fight is over. At the beginning of the war there was somewhat of a breach between the front and base in France and the base in England. Now there is no such breach and the experience gained at the base is transmitted to the front and surgical procedure varied in accordance with the results.

Sympathy between the different units through which a wounded man passes is essential. There has always been a tendency to criticise the unit in front of you; but it is always well, if you feel critical about the condition of a patient whom you received from a unit nearer the firing line, to try to put yourself in the position of the medical officer from whom you received the patient. It has often happened to me when treatment has seemed open to criticism, to find that all has been explained by a personal visit to the medical officer, or unit from which the case has been received. The passing of a wounded man from one unit to another is unavoidable in war, but every attempt must be made to lessen the disadvantages by the interchange of knowledge and the cultivation of friendly, not captious, criticism.

There is another way in which knowledge has been diffused. I refer to those medical societies which have been instituted in various areas. These are, of course, largely concerned with local interests, but the work they have done has been extraordinarily good. There is a society at one of the bases which has been of more than usual value, as in it medical officers, through whose hands the patient passes in his journey from the trenches to the base, have met, and such meetings have been very useful in making clear to the medical officers the difficulties that are met with in the various evacuation hospitals. I am quite sure that these meetings have tended to make men more sympathetic to those who are working under different conditions.

Again, I believe that one of the most useful functions of a consulting surgeon has been the carrying of facts or opinions not only from the front to the base, but from one unit to another.

THE FASCINATION OF ABDOMINAL SURGERY.

That it is a fascinating subject there can be no doubt. It is still more or less an unknown region in surgery. It is a comparatively new subject and has risen from nothing to its present position during the lifetime of most of those present. Even in civil practice there are many problems still to be solved, and naturally there must still be many more in surgery of the abdomen in war. Its interest lies, perhaps, in the need for rapid decision, rapid action, and in a supposed dexterity which is not required in other branches. It is the Mecca of all young surgeons—and, for the matter of that, of many old ones. There is more joy, possibly, over one abdominal wound which recovers than over twenty other more ordinary cases.

It is a curious fact that interest in abdominal surgery is shared by the public, as anybody may ascertain who has followed the discussion on the treatment of abdominal wounds in this war. If the abdomen is an unknown ground to the profession, it is still more so to the ordinary public—hence the interest of the layman.

SURGICAL OPINION WHEN THE WAR STARTED.

There is no doubt that for many years it has been held that the operative treatment of abdominal wounds was not to be advised under war conditions. This was partly due to

want of success, as in the Spanish-American War, and partly to the fact that many military surgeons were opposed to extensive operating anywhere near the firing line, and as abdominal surgery, to be successful, must be done at once, it is obvious that it could not be undertaken with success where all operations had to be postponed to a late period. Although the expectant treatment was the orthodox one when the South African War broke out, many civil surgeons hoped to prove that it was wrong. Surgeon-General W. F. Stevenson even issued an appeal for the trial of operation. The result was, however, only to confirm former opinion, though this opinion was now held on two somewhat different grounds. One school held that the expectant treatment was in itself the right procedure, the other that it was the best that could be done in war.

Some people believed that wounded intestine healed sufficiently often to warrant abstention, others, headed by Makins, believed that small-gut lesions were practically always fatal, and that the success obtained by the "wait and see" policy was due to the escape of the bowel, although the belly had been penetrated. Makins's opinion that the small-gut area could be traversed by the small bullet without injury has been proved in this war. If one reads the literature of the South African War, both private and official, the reason for want of success is at once obvious—the cases arrived too late. It was not so much a question of the success of the expectant treatment as a failure of the operative. Operations were secondary or late, and two strikingly successful cases of resection of small gut (Messrs. Neale and Tuke) were operated on within 6 and 12 hours respectively.

The reason for the late operation was the nature of fighting in an unsettled country of great distances. The wounded could not be quickly brought to a hospital equipped with the necessary appliances. To operate in the veld with what appliances were at hand was too disheartening. It was impossible to get even moderately decent conditions. There was little or no water, and what there was was often too filthy for words—the water of dams. In addition there was the plague of flies that settled on everything, and, lastly, the operated man could not be kept quiet; it was lucky if he could ride in a horse ambulance.

The conditions were utterly different from what now pertain, and this is the first time since the rise of abdominal surgery that a great campaign has been fought in a settled country and, what is more important still, with a fixed fighting line.

The small number of figures dealt with in the South African campaign was also a source of error. In order to form an adequate idea of the efficacy of any treatment it is necessary to strike an average over a large series of cases. Now, in this present war one of the difficulties of establishing the operative treatment were the runs of bad luck which any operator had to face. Even now, with conditions as nearly ideal as possible, one may meet a series of nine consecutive fatal cases. This must have a very depressing effect on any young surgeon or one who is not convinced that the operative treatment is in the main the best of all. Now, nine abdominal cases means roughly about 600 wounded men, taking a moderate estimate of the proportion of abdominal wounds to total wounds. As a matter of fact, in the South African campaign a casualty list of 600 wounded was considered a large one. It can therefore be seen that if an operator happened to encounter such a series it is not to be surprised at that he had doubts as to the correctness of his procedure.

The statistics of the South African campaign are very defective. Surgeon-General Stevenson, in the official history of the war, was only able to collect 207 cases of abdominal wounds. Among them it is stated that there were 26 laparotomies with 18 deaths, a mortality of 69·2 per cent., and according to Stevenson the mortality was really even worse. The total death-rate of all abdominal wounds quoted, operated and unoperated, is given as 30·4 per cent.

In his most recent work, 1910, "Wounds in War," the mortality is shown as 51·6 for laparotomies, the total of cases remaining the same—namely, 207. In any case the figures are really too small to have any real value. Figures show that in the present campaign a mortality of 50 per cent. is a good result, but such a mortality in civil practice would be considered an awful death-rate to face. And yet it means, looking on the bright side, many lives saved.

There is no doubt that certain people shot through the abdomen in South Africa, and treated expectantly, recovered. As a matter of fact, there were two officers well known in the R.A.M.C. who recovered after such treatment, and I have no doubt that a knowledge of their recovery greatly strengthened the opinion that expectant treatment was, on the whole, the best. There is no doubt that such successful cases make a very great impression on one.

The South African campaign may then be said to have left surgical opinion opposed to operation. This opinion seems to have been only strengthened by succeeding wars—the French War in Morocco, the Balkan War, and the Russo-Japanese War. In the last war the results were so bad that the Japanese forbade operation in the ambulances; even in the fixed fighting round Port Arthur little measure of success was obtained. On the Russian side, it is interesting to note that a Princess Gedröitz, in an operating wagon, met with some measure of success, and fixed the limit of successful intervention to three hours after the receipt of the wound. It is stated, at all events, that she saved the life of a colonel shot in the small intestine.

METHOD OF TREATMENT IN THE EARLIER PERIOD OF THE WAR.

It is not intended here to say anything about the period of the retreat. Under such conditions adequate provision for operating near the front was an impossibility, and all that could be done was to get rid of the wounded to the base with the least possible discomfort to them. When the line became fixed the conditions were very different and there was a possibility of operating under good conditions. It was no longer a question of whether a man could be operated upon, but whether he should be operated upon. Still, however, the old belief in the efficacy of the expectant treatment obtained.

In order to understand what was done during this period it is necessary to say a word or two about the standard system by which the wounded man was evacuated. Shortly, it was as follows: A wounded man was first seen by the regimental medical officer to whom he was brought in the regimental aid-post situated somewhere in the trench system. He was then transferred by a stretcher to an advanced dressing station, usually situated just behind the trenches, and from there by car to the field ambulance and there he was kept until the time the motor convoy arrived—usually once in the 24 hours. By this he was taken to the casualty clearing station, which was the first place adequately equipped for operative treatment. In the early days the clearing station was a very different hospital from what it is now. But, still, there was reasonable facility for the performance of any operation if it was thought advisable. With the idea of avoiding the disturbance of movement, a man wounded in the abdomen was kept sometimes, though not usually, in the regimental aid-post; often he was kept at a field ambulance, but usually he was transferred to the casualty clearing station and there treated.

The usual mode of procedure was to put the man in the Fowler position, to improve the general condition by rest and warmth, to withhold food and water for three days and to administer morphia. The thirst which was a distressing symptom of this treatment was combated to a certain degree by rectal salines and mouth-washes.

I should like here to pay tribute to the great care and attention which the medical officers lavished on the cases. Certain officers were told off day and night to attend to these patients, and everything that could be done to alleviate their suffering and to make them as comfortable as possible and to cheer them up was done. I should say that if anything could have got these men well the attention that they received would have done so. The people who conducted the treatment were firmly convinced of its efficacy.

This belief was strengthened by the behaviour of the patient. Many patients, at first gravely ill, went through a period of improvement which often was very striking. It was in a way unfortunate; but there is no doubt that improvement did take place, and so well were many of them that they were evacuated to the base and arrived there sometimes in good condition and sometimes gravely ill. The men who saw the cases leave them apparently on the way to recovery could not bring themselves to believe that such cases did badly at the base. It was unfortunate, no doubt, that the means of communication between the base and the

front was, in those days, inadequate, and this serves to emphasise what I have already stated about the value of free interchange of reports between the front and the base.

If evacuation of these cases had not been necessary and it had been possible to keep them at the clearing stations, I have no doubt that the expectant treatment would not have survived as long as it did, for medical officers would have seen such cases become worse and worse, and in the end die. As a matter of fact, during my six months' experience at the Red Cross Hospital at Netley, I only saw two cases of wounds of the abdominal viscera; one was a case of cæcostomy and the other a transverse colostomy.

When I arrived in France in May, 1915, I spent some time at the base before I was sent to the casualty clearing stations. I had the advantage of learning what was Sir George Makins's experience in the unoperated abdominal cases and heard that many died who had been thought well enough to be sent to the base. I had always believed that operative treatment, provided adequate arrangements could be made, was the ideal thing. What I saw at the base and front only confirmed me in my belief that the best hope for the patient lay in an operation. I had no doubt that many cases which were put down as penetrating abdominal ones had not suffered injury to any hollow viscus, and many that were considered penetrating were really only wounds of the abdominal wall. I certainly saw many people treated by the expectant treatment die even at the casualty clearing stations, some after the period of delusive improvement.

The expectant treatment was also a very trying time for the wounded man. The knowledge that nothing could be done for him by operation, and that the only thing was to wait events, had a very depressing effect, although the medical officers did everything to cheer them up. The idea was getting about that the doctors were unable to help a man who was wounded in the abdomen, and that he had really little chance.

It is curious, but true, I think, that the wounded soldier welcomes operation. He feels that something is being done for him. I have often been asked the question, "Can't you operate?" If I have answered in the negative, with an assurance that operation is unnecessary and that he will do well, I have often detected a look of disappointment on the patient's face. I mention this as showing that operation has no horrors for the soldier.

EXPERIENCES OF THE ALLIES.

The French have gone through very much the same experience in the treatment of abdominal wounds. At first the only operation officially blessed was that of the suprapubic drainage of Murphy. Gradually they have, like ourselves, abandoned the expectant for the operative treatment.

I cannot do better than quote you a letter which Professor Tuffier has kindly written me. He says:—

Abdominal surgery has undergone in France the following revolution. Until the month of February, 1915, installations did not allow one to operate, under good conditions, on wounds of the abdominal cavity, and abstention was necessary in these circumstances. At this period I found in a small ambulance quite near the front, and very well organised, several cases of cure of wounds of the intestine by laparotomy. I reported them to the Society of Surgery and a movement commenced in favour of operation for all abdominal wounds. It is because the motor surgical ambulances and the medical arrangements have been better organised, and because the evacuation of the wounded has been done in a relatively short time, that we have been able to arrive at a certain measure of success.

With the French, as with us, the period of the retreat corresponded to the period of expectant treatment, and when the line became fixed the treatment underwent the same change as it did in the British Army. As a matter of fact, after the establishment of the operative treatment some French surgeons have from time to time again championed the expectant treatment, but this finds little acceptance with the majority of French surgeons.

MORTALITY IN THE PRE-OPERATIVE DAYS.

One is surrounded by all sorts of difficulties in trying to reckon the mortality, and all the figures that can be obtained must be considered only approximate. One of the chief difficulties is the determination as to whether a wound is really penetrating. Those who favour the expectant treatment would naturally tend to include cases which those who are opposed to this treatment would exclude.

Into nine field ambulances over a period of six months there were admitted 1098 abdominal wounds with 333 deaths—a mortality of 30 per cent. In the six casualty clearing stations during the same period there were admitted 131 cases of perforating abdominal wounds with 73 deaths. From these figures it appears that the total mortality in the field ambulances and clearing stations was about 70 per cent. This, of course, does not include the deaths before patients reached the unit where statistics are kept.

There were also the deaths at the base in France to be added, and in the pre-operative days to which we now allude many such deaths occurred, which would, as far as can be judged, bring the mortality up to about 80 per cent.

As showing the difficulty of arriving at accurate figures, it may be stated that statistics were prepared by certain people which stated that 80 per cent. of abdominal wounds recovered. These statistics, as a matter of fact, were got from certain ambulances and casualty clearing stations in which the surgeons were enthusiastic supporters of the expectant treatment. It is significant that in these units the proportion of abdominal wounds to total wounds was high.

In talking over the possibility of improvement with Colonel Crisp English, with whom I was fortunately associated when trying the effect of operative treatment, I used to say that if one could bring about a reduction of the mortality by 10 per cent. one would be fortunate. There was no question of revolutionising the mortality, because with the abdominal wounds there would be a very heavy mortality, and it was only a question of saving a certain number of lives which otherwise would have been lost by the expectant treatment.

COMMENCEMENT OF THE OPERATIVE TREATMENT.

Although rest treatment was the rule, some attempts at operation had been tried. Early in the war Souttar commenced early operation with the Belgian Army, and credit must be given to him for what he did. Owen Richards was the first, I believe, to publish results of operative treatment in the British Army.[1] The first case of operation was performed on Jan. 28th, 1915, and the first successful case, that of a resection of $2\frac{1}{2}$ feet of the small intestine, was performed on March 18th, 1915, 36 hours after receipt of the injury, which period still stands as a record as regards time elapsed since the wound. A few other English surgeons had tried what could be done by operation, but the results were undeniably bad—so bad that most people had abandoned the attempt. The reason for this was, no doubt, the late arrival of the cases at a place where an operation could be performed.

Holding the opinion that operation was right, I commenced operating and making post-mortem examinations and soon convinced myself that the injuries were, as a rule, of such a nature that recovery must be a very rare event. It was also found that hæmorrhage was a chief cause of early death and that bullets produced very extensive injuries. It has always been granted that hæmorrhage was the chief cause of early death, but the advocates of expectant treatment seem to have focussed their attention more on the danger of peritoneal infection and the possibility of its localisation or disappearance than on the possibility of spontaneous arrest of hæmorrhage.

The discovery that bullets produced extensive gut injuries was also of great importance, as much stress had been laid on the smallness of the lesions produced by the modern small-bore bullet; in fact, the hope of spontaneous recovery of gut lesions was based on the assumption that such projectiles were comparatively innocuous. This idea was constantly put forward in the early period of the war.

The re-establishment that hæmorrhage was the chief cause of early death was of great importance, as it showed that only by rapid evacuation could one hope to combat such a condition. In June, 1915, I talked the matter over with Surgeon-General W. G. Macpherson, and obtained his leave to get some of the field ambulances to send the abdominal wounds at once with all possible celerity to the nearest casualty clearing station. The results obtained by this small experiment were encouraging, and in the first week in August, 1915, Surgeon-General Macpherson gave the order which made the rapid evacuation of abdominal wounds the official method in the First Army. This was followed by rapid improvement in the results obtained.

[1] Brit. Med. Jour., August 7th, 1915.

SELECTION OF CASES FOR RAPID EVACUATION.

The order to transfer all abdominal cases with celerity to the casualty clearing station put a great deal of responsibility on the field ambulance officers. It is no light task to decide what cases can stand evacuation; in fact, it is one of the most difficult things that a medical officer is called upon to determine. Many cases, of course, are better of a rest and food and warmth, but in the case of abdominal wounds it must be remembered that hæmorrhage is a chief cause of death, and that the only hope for their salvation lies in the arrest of the hæmorrhage by surgical means. It is, therefore, obvious that it is worth while taking risks in cases of abdominal wounds which it would not be right to take in other cases. It is quite true that there is an appreciable danger of death from peritoneal affection, but, as a matter of fact, experience has shown that the need for celerity on this account is nothing compared to that necessary in the cases of hæmorrhage.

COLLECTION AND EVACUATION OF WOUNDED.

In forming a judgment on the results obtained by the operative treatment of abdominal injuries it is necessary to know something about the means by which such cases reach a casualty clearing station. A knowledge of the difficulties is also necessary in order to form an appreciation of the really magnificent work which is being done by the regimental medical officer and his stretcher bearers and by the personnel of the field ambulances. One can consider this subject under two heads: (1) the collection; (2) the evacuation of the wounded man.

1. By *collection* is meant the finding and bringing back to the regimental aid post the wounded when they lie out in front of our lines; and without going into particulars it can be well understood what the difficulties are when an attack has been made and our troops have advanced. If it is difficult to find and collect the wounded after a successful attack, it it still more difficult when the fortunes of battle sway backwards and forwards; and it is under the latter conditions that the wounded lie out for a considerable period. In quiet times the collection is not difficult, for the men are wounded very often in the trenches themselves.

2. *The evacuation.*—We will consider that a man has been wounded in the front trench. The first field dressing most probably will be applied by himself or by one of his companions; possibly by the medical officer himself. The patient will then walk, be carried, or be taken on some kind of stretcher to the regimental aid post. Even this is performed under considerable difficulties because the nature of the trench system involves getting round many sharp angles. The regimental aid post is situated somewhere near the front line or in the commencement of a down communication trench. It is generally in a dug-out, or cellar; the accommodation is not grand, but one cannot help admiring the ingenuity with which these places are arranged and the care taken to make the surroundings as perfect as possible. The neatness of such places is really greatly to be wondered at, fitted up as they are with extemporised shelves and tables and trestles for the stretchers. Here the wounded man will be attended to if the regimental medical officer has not already been seen by him. An adequate dressing will be applied and the ordinary medical measures taken for his comfort.

Under the present system of evacuation an abdominally wounded man will not wait in this place. He will be taken on a stretcher down the communication trench to a field-ambulance post, which is a dug-out where the field ambulance personnel are accommodated and where the regimental stretcher-bearers hand the case over to the field ambulance. From this point commences the long journey—sometimes as much as two miles—down the communication trench. Everyone has seen pictures of such a thing, but to appreciate the physical strain on the bearers the journey has to be made by oneself. Sometimes the journey is so arduous that one complete tour is all that a stretcher party can manage without a long spell of rest. In summer time the air is often stifling. Under foot are the duck boards or a rough brick pavement. The provision of these renders walking more easy, but the surface is necessarily uneven, especially where one board joins another. Sometimes a rung is out, and at other times the board is apt to tilt and get up and look you in the face. Then there are the innumerable corners formed by the zigzag of the trench and made to stop the enfilade fire and limit the danger of an exploding shell, or to prevent the enemy looking straight down the trench.

In winter, or after rain, the surface of the boards is greasy in the extreme, and sometimes they are completely under water. At night-time the difficulties, as may be well imagined, are greatly increased. Sometimes the turns in the trenches are so sharp that the traverses of the stretcher have to be closed in order to allow its passage round the corners.

Much ingenuity has been expended in devising stretchers for the easier transit of the wounded man, for getting round corners easily and relieving the work of the bearers, for the strain on the shoulders produces an intolerable ache in the neck. In some cases the stretchers are carried on the bearers' shoulders, the wounded man's legs lying in troughs projecting past the bearer's head, the idea being to shorten the "wheel base," as it may be called, of the stretcher party. In other cases the patient is carried almost upright on a stretcher that somewhat resembles the back board of a Swiss mountain porter. Many wheeled stretchers have been tried, but the inequalities of the ground and the sharp corners to be turned are difficulties which have not yet been overcome. Sometimes it is possible to put a man on the trolley-line and run him down over the open ground. In some cases the trenches have an overhead mono-rail on which a short form of stretcher can be suspended.

At the end of the communication trench the patient comes to the advanced dressing station. This, as a rule, is more spacious than the regimental aid-post, but is often similar in construction. Sometimes it is a ruined château—not quite the place that the word château may possibly call to your mind—a château is often a euphemistic name for a villa which would be equally at home in Clapham. Nearly all the houses—even the workmen's cottages—in Northern France have cellars, and these cellars have been really a godsend to the wounded. If the accommodation is not sufficient it is increased by dug-outs. These are made sometimes of heavy timbers covered with earth and sandbags, or at other times with sections of steel tubing commonly known as elephants, treated in the same way. At another time a farm or cottage is used. Here the cellars are again occupied, or the ground-floor rooms are made safe by building within them splinter-proof shelters formed of steel sheets and sandbags, and in some places where the subsoil water is found at a very shallow level shelter to the wounded is given by building splinter-proofs on the surface of the ground, heavily timbered and sandbagged. Although the medical arrangements are here a little more extensive and a larger supply of splints and appliances are kept, as a rule they are of a simple nature and used only to render the patient's transit as comfortable as possible.

Although many wounded men rest here the man with an abdominal wound, if his condition permits, is placed at once in an ambulance, covered up with blankets, and warmed by hot bottles. Here he is quickly taken in a motor ambulance to the tented section of the field ambulance. As a rule, the patient will not be removed from the ambulance, but he will be looked at by the medical officer and, if his condition is sufficiently good, at once sent on to the casualty clearing station. If the field ambulance happens to lie off the road to the nearest casualty clearing station the patient is, as a rule, taken straight to the latter, time thus being saved.

The field ambulance, or, as it is sometimes called, the headquarters or tented section, is usually situated in schools or some sort of public building; sometimes in cellars or dug-outs if the neighbourhood happens to be unhealthy. Usually such places are not shelled, but they are, as a rule, well within the range of hostile shell-fire.

The casualty clearing station is the first unit through which a man passes where adequate arrangements are made for operative treatment, the tendency being for all units in front of this to be merely concerned in the transport of the wounded or in doing very urgent surgery such as the arrest of hæmorrhage. In one of their functions—namely, that concerned with operations and after-treatment of cases that cannot bear further transport—our casualty clearing stations have become hospitals, and in them are all necessary paraphernalia for the performance of any surgical operation that may be required at this stage. They are situated out of the usual zone of hostile artillery fire. They have been estab-

lished in all sorts of buildings—schools, châteaux, asylums, tents, and huts; the arrangements, of course, are determined by the building. The tents have this advantage, that you can arrange your hospital as you like. Buildings are very comfortable in winter and are better lighted and more cheery, but very often are not so convenient, especially when the upper storeys have to be utilised. Huts possibly are the best of all, as they have the advantage of buildings and can be arranged on a considered plan. Unfortunately, they are not so mobile as tents.

In the recent fighting on the Somme the tented casualty clearing stations were the rule for the very good reason that no buildings were available. The general plan of these is as follows: There is a large reception-room made by lashing tents together to form a dressing-room. Here the wounded, arriving off the cars, are carried; here they are examined by the medical officers and particulars taken by the clerical staff. The lighter cases have their wounds dressed and are passed on to a series of tents called the "evacuation area," or they are at once put on to the train in which they travel to the base. The more serious cases are put into the "treatment area," and here their clothes are removed; they are cleaned up as well as possible, fed, and warmed. From here they are taken into the theatre, where their wounds are properly attended to, and from here they pass again into another tent in the treatment area where they remain until ready for transmission to the base.

Many clearing stations have a ward where men arriving in a grave condition are placed, and every attempt is made by warmth, food, and adequate means to bring them back into such a condition that they can be operated upon if necessary.

All casualty clearing stations, no matter where situated, have now very large operation accommodation; all of them have space enough to set up three tables at least. Every attempt has been made to provide long wooden huts for the theatres where there is a good light and where an adequate temperature can be maintained. These theatres are adequately furnished with all the appliances which are necessary for the performance of the operations which have to be done in such units. The staff varies according to the work it is called upon to do. The staff in pressure times may be three times the normal establishment, not only in medical officers, but in nurses.

The casualty clearing station has to be put in such a place that it can be easily reached by the ambulance cars and so arranged that the cars can be passed back on a different road from that on which they came, or by a road which allows of a double line of traffic. It is either on or near a railway, and by far the best arrangement is where it has a siding on which an ambulance-train can stand to which the patients can be transferred by hand-carriage straight from the tents to the train. This ideal, however, is not always obtainable, and then the wounded have to be taken by ambulance-car to the railhead. This, of course, means more labour for the personnel and more jolting for the patient.

Relative Frequency of Abdominal Wounds.

Stevenson says in recent wars 15 per cent. of the wounded are hit in the abdomen and about 4 per cent. reach hospital. In the Spanish-American War the percentage of abdominal wounds to total wounds was 2·6 per cent. In this present war the actual number of abdominal wounds will never be known, nor is it particularly important.

The number of abdominal wounds admitted to the field ambulance and casualty clearing stations are, subject to certain errors, known. The error is caused by the impossibility of accurately diagnosing the perforating abdominal wound. Since the onset of the operative treatment the error, of course, has diminished. The numbers, as a matter of fact, vary with each observer, and a surgeon who believes in the expectant treatment will be inclined to reckon as perforating the wounds which a believer in the operative treatment would place as non-perforating. The following figures were taken in certain casualty clearing stations by careful observers, but of different surgical persuasions, during a period in which the expectant treatment was paramount.

Percentage of Abdominal Perforating Wounds to Total Wounds.

(*a*) = 1·88 per cent.	(*c*) = 0·75 per cent.
(*b*) = 1·5 ,,	(*d*) = 0·62 ,,

If we take the statistics from nine field ambulances and certain casualty clearing stations over a period of six months we get the following figures:—

The Percentage of Abdominal Wounds to Total Wounds.

Field ambulances	1·92 per cent.
Casualty clearing stations	0·72 ,,

The difference between the figures in the field ambulance and casualty clearing station is accounted for in the following manner:—

1. The field ambulance will naturally and rightly err on the side of making the graver diagnosis.

2. The mortality was high in the field ambulances, so that fewer cases reached the casualty clearing station.

3. At the casualty clearing station a more careful diagnosis will act in two ways: (1) It will include some buttock, chest, back, and thigh wounds as abdominal wounds; (2) it will exclude many cases of wounds of parietes. On the whole, the effect will be to lessen the proportion of abdominal wounds to total wounds.

From these figures, which must be considered only approximate, the important facts stand out—namely, the relatively small number of abdominal wounds that a surgeon is called upon to treat, certainly under 2 per cent. of all wounded. The moral to be drawn is that one must not be led away by one's interest in abdominal wounds to spend more time and attention on them to the prejudice of the far larger number of wounds of a different part of the body. We must constantly bear in mind that all arrangements must be made so that the greatest good is done to the greatest number. If the number of medical men were unlimited this would not apply, but with a limited number of surgeons the best possible use must be made of their services.

Method of Recording Cases.

This paper is based on all abdominal wounds which reached an operating hospital from a certain sector of the line over a period of 18 months. In arriving at a conclusion of the mortality of abdominal wounds and what can be done for them by operative treatment it is necessary to take a sector of the line and to include all the cases, no matter at what hospital they are treated. Results do differ in different hospitals, more or less depending upon their distance from the firing line; they will also differ according to the nature of the fighting. Again, if times are quiet there is plenty of time to treat adequately and deliberately all cases. At another time, when active operations are in progress, it may be only possible to pay attention to the most favourable cases. It is also necessary not only to reckon your operative mortality but also to bring into account all cases which arrive too bad for operation. This has been done in the present series. In the case of the moribund cases we have their numbers, but we do not in every case possess details of the injury. The statistics were collected in the following way: Every hospital which was called upon to treat abdominal cases was provided with a book in which certain headings were written down and filled in at the time of operation by the medical officers. In the early days these books were Admission and Discharge Books altered for the purpose. Later on, by the kindness of the Medical Research Committee, we have had supplied books provided with adequate headings which could be quickly and accurately filled in.

Comparative Mortality of the Casualty Clearing Stations and Abdominal Hospitals.

The following figures show the differences in results which may be obtained in different hospitals under different conditions, and the necessity of including them all in your statistics if you wish to obtain an accurate result.

The following are the total mortality at four different hospitals during the same battle:—

(1) A casualty clearing station	54 per cent.
(2) An advanced operating hospital	36·36 ,,
(3) An advanced operating hospital	82·64 ,,
(4) A casualty clearing station	72·73 ,,

(1) A forward casualty clearing station.
(2) Was never pressed. (Mortality here during 7 months was 54 8.)
(3) Very heavily worked, many cases arrived late.
(4) A back area casualty clearing station.

Time Factor.

The table below was compiled by dividing the time between the receipt of the wound and the performance of the operation into two-hourly periods and noting whether cases were sent

to the base or succumbed to their injuries. It mainly shows two things: (1) it gives some idea of the time in which cases are got out of the trenches and submitted to operation; and (2) it also shows the effect on the mortality of the time which has elapsed between the receipt of the injury and the performance of the operation. It will be seen that most cases

TABLE I.—*Effect of Time on Mortality.*

Hrs.	-2	-4	-6	-8	-10	-12	-14	-16	-18	-20	-22	-24+
	B. D.	B. D.	B. D.	B. D.	B. D.	B. D.	B. D.	B. D.	B. D.	B. D.	B. D.	B. D.
	2 2	13 17	35 21	28 35	18 20	11 12	4 4	3 6	8 10	2 6	0 1	22 43

Hrs. = Hours. B. = To base. D. = Died.

To base.		Died.	
Hours.	Injury.	Hours.	Injury.
24	Colon.	6	Small gut and hæmorrhage
57	Bladder.	6	,, ,,
24	Sigmoid.	5	Gas gangrene of abdominal wall (post-operative).
30	No visceral injury.	3	Hæmorrhage.
48	,, ,,	4	Stomach and duodenum.
26	Jejunum.	4	Small gut and hæmorrhage
15	Stomach.	4	Stomach.
65	Rectum—extra-peritoneal.	6	Multiple wounds.
72	Colon.	3	Colon.

arrive some time between 6 and 10 hours after receipt of the injury. If over 12 hours the mortality mounts; above 24 hours it appears that there is very little hope of getting a good result.

To the table have been added a few cases in which patients have died after an unexpectedly short period and also those in which recovery has followed the elapse of a long period between the receipt of the wound and the operation. So far the limit of successful cases has been 36 hours for a resection of the small intestine and 36 hours for a suture of the colon.

WHERE TO OPERATE ON ABDOMINAL CASES.

From the operative point of view the sooner the patient is submitted to operation the better. From a post-operative point of view it is desirable to do the operation in some place where the patient can be kept quiet and properly nursed. It will be seen that for very obvious reasons it is not possible to satisfy both conditions. If you were to operate on a patient at the very earliest possible moment it would be in some place where the nursing was bound to be of a very primitive nature. It would also have to be in some place which is exposed to shell-fire. Now, shell-fire has a very bad effect on patients, and men who are well-nigh careless of its effects when active and in good health are very much upset by it when lying passive in bed. Again, you cannot well keep your sisters in such places, although on many occasions they have done magnificent work under conditions of this kind. Then, again, you must consider the greatest good for the greatest number—one must do what is best for the majority. The setting out on a large scale of the special advance hospitals means the dissipation of personnel, and medical officers, orderlies, and nursing sisters are none too numerous for the work they have to perform. Then, again, if you have special hospitals you have to have special arrangements for evacuation. It may be stated that the best place for a casualty clearing station is some 10,000 yards behind the line on a railway or canal with good roads leading to it. Taking it all in all this is the best place for abdominal surgery. Remember that most of the time in getting a patient to an operating centre is spent within the trench system; the road journey is short, and although there will be some shaking in a motor ambulance it will be a good deal less than the patient has already experienced during the period of hand-carriage. If a patient arrives at a casualty clearing station 10 hours after the receipt of a wound it will most probably be found that only 60 minutes have been spent in traversing the distance from the trench system to the casualty clearing station.

It may be well to say here something about the mobile operating vans. They have loomed somewhat largely in the public mind and have been a good deal discussed. The idea is that you can have the motor van fitted out as an operating room, and that such a van should seek the patient rather than that the patient should be brought to the theatre. It may be stated at once that this idea is impracticable, and much more time would be spent in getting to the patient than is now spent in getting the patient to an ordinary clearing station. When speaking of a mobile hospital-van it must be understood that one does not include in this category a theatre which can be rapidly erected, adequately warmed and lighted, such as the French have made use of on many occasions; such units are only meant to be mobile in much the same degree as the casualty clearing stations are mobile. On the other hand, special hospitals are very good under certain conditions. In the Army to which I am attached Surgeon-General Macpherson established two such hospitals, and Surgeon-General Pike another, and I will briefly describe them.

The first one, which we will call No. 6, was situated in a bleaching mill; it was about 5000 yards behind the firing line and took all the abdominal wounded of a certain corps. It was formed by sending an operating surgeon and an anæsthetist and four nursing sisters to supplement the personnel of a field ambulance which was situated in this building. It had a very good theatre and a large ward, which in cold weather was steam-heated. The evacuation arrangements were under the care of Colonel B. M. Skinner, the D.D.M.S. of the corps, to whose energy its success was greatly due. Here we got cases frequently within two hours or less, the patients being carried straight from the spot where they were wounded to the hospital, irrespective of what division they belonged to. This hospital was never pressed and never had the strain of a large fight placed upon it. It continued to do its good work until the enemy began to pay attention to a bridge which crossed a canal on whose banks the mill was situated. Then it was shifted a bit to one side and to another building which was much less commodious. There it remained until the area passed out of the jurisdiction of the Army. The sisters and operating surgeon and anæsthetist were then moved to a different part of the line and were re-established in the ugliest château it has been my misfortune to see. It was situated about 9000 yards behind the line and in a very much more difficult sector as far as evacuation was concerned. Here it continued to do excellent work, although the railhead and a coal-mine near by were continually shelled, many of the shells coming into the garden uncomfortably close to the house. It was closed at last, as a casualty clearing station was opened near by. Strange to say, the day on which it was closed was the last day on which the place was shelled. This hospital was also never pressed and the results, as in the last, were very good.

The third hospital was opened in a field ambulance just before the onset of a big battle; and it was arranged that all the abdominal wounded from a corps should be brought to it. As a matter of fact, in the stress of battle the wounded from two corps were carried to it. The result was that the place was heavily worked and the results were not so good as in the last two.

I will mention a fourth abdominal hospital, although it was not in the army to which I am attached, because there are some lessons which can be learnt from it. Experience had been gained by the overwork of the last hospital and adequate arrangements were made to prevent it in future. The personnel of this particular hospital was adequate for its needs. In addition, it was arranged that when the hospital became full the wounded should be sent on to a casualty clearing station situated somewhere farther back. The result of this arrangement was that all the abdominals that had the good fortune to be admitted were well and rapidly treated

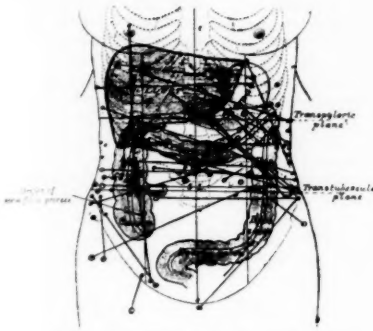
The lesson to be learnt from the experience gained at such hospitals can, I think, be summarised as follows: That in quiet times such hospitals opened at field ambulances by the provision of an operating surgeon and a few sisters can do magnificent work and save life. If, on the other hand, such hospitals are to be opened in times of battle, it is necessary to have very much the same personnel that is allowed by the establishment of a casualty clearing station.

ARRANGEMENTS AT THE PRESENT TIME IN THE FRENCH AND BELGIAN ARMIES.

It has been said above that the French and Belgians went through the same experience as ourselves. As the line became fixed, operation became the established practice. The French have established advance abdominal hospitals

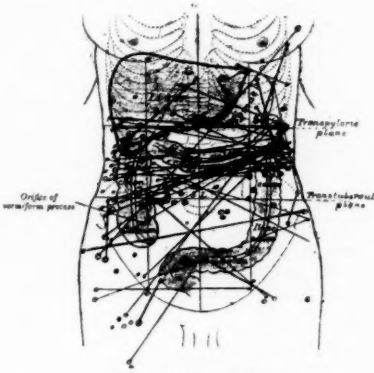
Charts showing the General Incidence of Fatal and Non-fatal Gun-shot Wounds of the Abdomen.

FIG. 1.



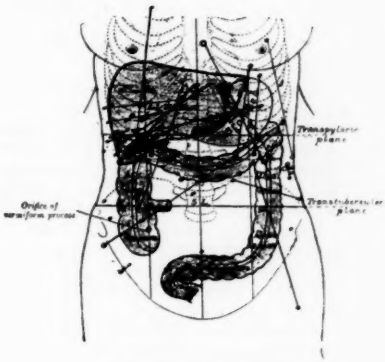
Coeliotomy. No wound of any hollow viscus. In a few instances a solid organ was hit.

FIG. 2.



No operation. Died.

FIG. 3.



No operation. Recovered.

These charts were made by indicating an anterior wound by a black mark, a posterior wound by a circle, and joining the two when they represented the entrance and exit wounds of a missile.

by means of what they call motor surgical ambulances; these are really hutted theatres which can be easily erected, and they are really extremely complete in their arrangements. These hospitals are pushed rather further forward than is the practice in the British Army, and have, I believe, met with a large measure of success.

Professor Tuffier also informs me that the French have established dug-out operating centres situated some hundreds of metres behind the trenches, where it is possible to operate on the wounded in from a half to two hours after the accident. He adds—which is of considerable interest—that with the very large attacks they have had and the great number of wounded they have had to be dealt with, this arrangement has not given very good results, for the reason that the wounded have arrived late, and very often these ambulances have been unable to deal with the numbers of wounded they have received.

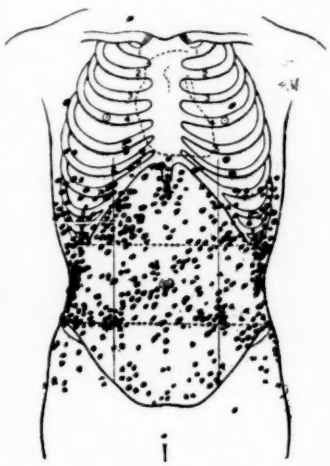
The Belgians have followed suit to a certain degree and have pushed their abdominal operating centres far forward and have lately provided special ambulances for the transmission of the operated man to the hospitals farther back. I have not so far ascertained what measures of success they have had, but the Belgians are favourably situated in that they have large base hospitals very close behind the firing line.

NATURE OF PROJECTILES THAT CAUSE THE WOUNDS.

Bullets.—There are very many different kinds of bullets used in this war, and apparently their number goes on increasing. As is well known, the standard English, French, and German bullet is a pointed one. The English and German is a composite projectile which is liable to break up into mantle and core. The French bullet is much longer than either of the above and is made of solid copper alloy. Although not liable to break up it is liable to very great distortion. Naturally, we are mostly concerned with the German projectile, which, as a rule, is pointed, but sometimes the old ogival-headed bullet has been extracted from wounds. All the modern pointed bullets are more unstable than the bullets of the Boer War. The instability is said to be most marked at the beginning and the end of the flight. Again, in this war, where the fight takes place amongst houses, there are many opportunities for the bullet to be deformed and deflected. Again, the velocity and stability of a bullet is largely affected by passing through sandbags or a parapet, which, as a matter of fact, has to be something like 4 feet thick to be bullet-proof. There is plenty of proof that, whether from inherent instability or from hitting some object, the bullet does spin, and in several cases a bruised impress has been seen on the skin which could only have been made by a sidelong impact of the bullet. Again, in those cases where two legs have been wounded by the same bullet the first leg has been perforated by a small standard track and the opposite leg has suffered a large gaping wound, the obvious explanation being that the bullet in passing through the first limb was made to spin and so caused a more extensive wound on the opposite member. A good deal has been heard about the explosive effect of the modern pointed bullet, and although one may say that it does cause worse wounds than the ogival-headed projectile, I am by no means persuaded that its so-called explosive effect is anything but a very rare occurrence. I am strengthened in this opinion by the study of accidental wounds, of which one sees a great number. Men are shot at all sorts of close ranges up to actual contact, and yet, unless a hard bone is touched, it is not usual to get the explosive type of wound.

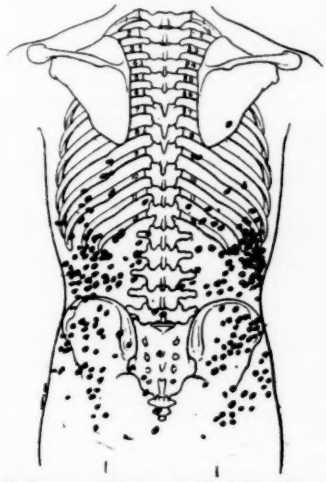
Charts showing the Regional Incidence of Wounds.

FIG. A.



Front view. 429 wounds. Mortality 53 per cent.

FIG. B.



Back view. 222 wounds. Mortality 60 per cent.

These charts were obtained by plotting the entrance wounds only.

Shell fragments.—These are, of course, of all sizes, but the fragments which are the cause of the abdominal wounds that the surgeon is called to treat are generally not more than 1½ inches in the greatest diameter, usually a good deal smaller. There are different kinds of shells used, and some importance may be attached to the nature of the shell by which the man is wounded.

High-explosive shells.—These shells may burst in the air, on contact with the ground, or after they have impacted themselves deeply in the earth. The velocity of the fragments into which the shell is

blown depends on the disruptive charge; and the fragments under such a condition fly out in all directions. The shape of the fragments depends largely on the type of shell—if the shell is segmented the pieces are more or less quadrilateral; if not segmented they have extremely sharp and ragged edges. Such shells, bursting on the ground, naturally become covered with dirt.

Shrapnel.—These shells usually burst in the air with a time-fuse. They are of all sizes and the leaden balls with which they are filled also vary somewhat in size. The penetrating power of such balls is due to the remaining velocity of the shell. The direction of the shrapnel balls will, as a rule, be downwards. In some cases apparently a shell is of a combined high-explosive and shrapnel type.

Bombs and grenades.—In the early part of the war these bombs were often extemporised and consisted of tin boxes filled with an explosive, scrap iron, cobblers' nails, and screws, &c. Now-a-days they are made of iron, the surface of which is marked with grooves, so that on explosion they break up into quadrilateral fragments. Sometimes the force of the explosive will cause a bomb to burst into smaller fragments, so that often they are no bigger than a big match-head. These fragments, although small, have apparently, from their high velocity, a very great penetrating power in the immediate neighbourhood of the explosion, although this is rapidly lost as the distance increases.

Trench mortars.—These are of various shapes, but consist essentially of a very large high-explosive charge with a comparatively thin containing envelope; they therefore burst very often into large ragged fragments as well as minute ones. They are generally timed to burst either on the ground or in the ground.

Bayonet wounds.—These are very seldom met with, being usually fatal on the field. Mention may be made of two cases. In the first the bayonet penetrated the man's back and came out by his umbilicus. No viscus was injured, and the man succumbed to hæmorrhage. The second was the case of a man who was late in answering a challenge and was bayoneted by the sentry. The bayonet entered the left hypochondrium and wounded the stomach near the greater curvature and entered the back wall of the abdomen. Though promptly operated on he died, not of his stomach wound but of retro-peritoneal sepsis.

RELATIVE NUMBER OF DIFFERENT PROJECTILES AND THE PROPORTION RETAINED.

Table II. has been drawn up with the intention of giving some idea of the relative frequency of the different projectiles met with in abdominal wounds; it also shows the relative number retained in the body. Now this table must be taken as

TABLE II.

Bullet.		Shell fragment.		Shrapnel.		Bomb or grenade.	
Out.	Retained.	Out.	Retained.	Out.	Retained.	Out.	Retained.
181	103	24	151	10	52	6	82
284		175		62		88	

only relative for several reasons. In the first place it is often impossible for a man to tell what hit him. In the second place one cannot always be sure from a study of the entrance and exit wounds what was the nature of the projectile; and, again, many do not differentiate between high-explosive shell and shrapnel, the soldier generally including most shells which are not of a large calibre under the name of shrapnel. As a matter of fact, there is very little difference in the nature of the fragments in high-explosive shells, bombs, rifle grenades or trench mortars if one excludes the larger fragments with which we are very little concerned.

Bullets.—Bullets and high-explosive shells furnish a large proportion of abdominal wounds. More bullets pass through the body than other projectiles. The reason for this is obvious. The causes for retention are not so obvious, and I have known bullets fired at a comparatively short distance remain within the body. In other cases the bullet may have passed through the earth and so have had its velocity diminished. Ricochets account for a certain number.

Shells.—These show a high proportion of retention. This is obviously due to the shape of the fragments. Shrapnel shows a large proportion, and this is no doubt due to the small velocity and round shape.

Bombs and grenades.—The retained fragments are strikingly in excess of those passed out. The large proportion of retained fragments at once suggests the possibility of armour; and, no doubt, armour could be devised which would keep out many fragments. It really is more or less a question of what the soldier is able to carry. One cannot help being struck with the resistive power of an ordinary book, as one has often seen projectiles arrested by such articles when carried by the soldier. The great saving of life produced by the steel helmet makes one hope that something could be produced which would be equally efficacious in protecting the body. Although we could not expect such shields to be supportable and bullet proof, yet the number of passed-out bullets is far out-numbered by the number of retained bullets, shell, and bomb fragments which possess far less penetrative power.

RELATIVE MORTALITY OF THE DIFFERENT PROJECTILES.

TABLE III.

Bullet.		Shell fragment.		Shrapnel.		Bombs or grenades.	
To base.	Died.	To base.	Died.	To base.	Died.	To base.	Died.
50	63	46	68	10	21	30	31

There is nothing very much to be learnt from this table, except that bullets are as dangerous as other projectiles, and that bombs and grenades seem to be the least noxious.

THE IMPORTANCE OF THE DIAGNOSIS OF ENTERIC FEVERS BY AGGLUTININ DETERMINATIONS.

BY E. W. AINLEY WALKER, M.A., D.M. OXON.,
CAPTAIN, O.T.C. UNIV. OXON.; FELLOW AND TUTOR OF UNIVERSITY COLLEGE, AND LECTURER IN PATHOLOGY IN THE UNIVERSITY OF OXFORD.

(Report to the Medical Research Committee.)

IN the course of recent criticisms directed to this subject several points of interest have been raised, and some misapprehensions have become evident which it may be of advantage to consider briefly. They are dealt with in the order of their publication.

I.—In a discussion on "The Technique of the Agglutinin Test" Dr. P. N. Panton[1] strongly dissents from my contention that "the microscopic method entirely fails *to give comparable quantitative measures of the titre of a patient's serum on successive occasions.*" He considers the microscopic technique commonly employed to be fully adequate for this purpose. In defence of this view he expresses certain opinions regarding the constancy of the materials employed, the general accuracy of the microscopic technique, and other matters whose validity ought not to pass unchallenged. Yet merely to deny Dr. Panton's statements categorically would not assist in illuminating the subject, while to explain in detail *ab initio* the reasons why they are misleading would require not only a repetition, but also a considerable amplification of my previous Note.[2] For he places one in this dilemma, that he makes statements contradictory of well-established evidence, much of it old and quite familiar, but at the same time he omits to adduce any experimental data in support of his position, such as could be submitted to critical analysis. In some cases he seems actually to be unaware of the factors which militate against accurate quantitative results in the performance of agglutination tests. For example, he still (so far as one can judge) makes the successive dilutions of a serum by adding more and more bacillary suspension, in apparent unconsciousness of the effects of the mass influence of bacteria on the absorption of agglutinins. These effects, however, are such as to render it essential that the serum, whatever its dilution, shall always operate on equal masses of bacteria if accurately quantitative observations are desired. Fortunately many of Dr. Panton's

arguments have already been admirably dealt with by Glynn.[3] It may therefore suffice upon the present occasion to meet his contentions regarding the value of the microscopic method for the purpose under discussion by examining its performance in the only direction in which he has brought forward definite experimental evidence. These observations of his own afford very valuable information. For though he himself interpreted them guardedly as evidence in favour of the exploded theory that in inoculated persons any febrile condition of a certain duration causes, or may cause, disappearance of the inoculation agglutinins, they serve in reality quite a different purpose. They prove to demonstration that the microscopic method as employed by him cannot for accuracy and reliability support any comparison with results obtained by the use of Dreyer's macroscopic technique. Indeed, his figures show that the results obtained by the microscopic method, even as regards the mere detection of agglutinins without considering the question of their measurement, are very much worse than one would have ventured to suggest was probable had these data not been supplied. The results of typhoid agglutination tests are recorded by Dr. Panton for 72 out of 100 consecutive cases in inoculated individuals who had suffered from various febrile conditions. They are tabulated below alongside the results for the first 100 similar cases examined by myself by Dreyer's method.

Cases examined by the microscopic method (Panton).		Cases examined by Dreyer's method (Ainley Walker).	
Typhoid agglutination.	Per cent.	Typhoid agglutination.	Per cent.
"Completely negative."	62·4	Nil, 1 in 25.	0
"Negative or partial."	16·7	"Standard," or trace 1 in 25.	3
"Positive."	20·8	"Standard," 1 in 50 or more.	97

By Dreyer's method every case showed measurable quantities of agglutinin in 1 in 25 dilution of the serum, and 97 per cent. showed "marked agglutination visible to the naked eye" in at least 1 in 50, and frequently in very much higher dilutions. But in the cases examined by Dr. Panton by the microscopic method the test was "completely negative" in nearly two-thirds and "positive" in only about 21 per cent. Nothing could be more convincing as regards the relative delicacy, reliability, and general accuracy of the two methods for the detection of agglutinins. A fuller justification could, indeed, hardly be found for my criticisms of the microscopic method than that here provided by Dr. Panton's own observations.

II.—In a letter to the Editor of THE LANCET Captain R. P. Garrow[4] makes some interesting comments on my recent "Illustrations of the Diagnostic Value of Agglutinin Determinations."[5] And one may certainly be permitted to endorse his plea for judgment and caution in the interpretation of the results of agglutination tests, particular regard being had to the methods employed. Probably we are much more nearly in agreement than the incisive character of some of his expressions might suggest. But in charging me with ignoring clinical observation as a means of diagnosis in enteric fevers he misunderstands me. My article was not concerned to discuss the clinical diagnosis of enteric fevers. To do so would be quite beyond my province. The point which it was desired to emphasise is that when and wherever these infections are abroad many mild and atypical cases may occur which are *not capable* of diagnosis by clinical observation alone. Moreover, in every case the differential diagnosis between typhoid, paratyphoid A, and paratyphoid B still rests, and is likely to remain, with the pathologist. The cases charted in my article purposely included a number of such mild or atypical attacks. And the fact that among the mass of cases which receive the provisional diagnosis "pyrexia of uncertain origin" cases of enteric fever may be numerous and important, that they form a grave source of danger, and that the agglutination test (even as commonly applied) affords the *best* criterion for their diagnosis is emphasised by competent authority, as follows (all italics mine):—

Osler and McCrae: System of Medicine, Vol. II., p. 178.—"Mild Typhoid Fever.—This is an exceedingly important group, especially as regards prophylaxis, for these mild attacks may not be recognised, *and the patients are the means of spreading the disease.* ..... The cases may be divided into two classes, the first including those characterised by a mild and short course, the other those in which despite the short course the onset is severe. .....*In many instances these mild forms are taken for malaria*, mountain fever, &c., while doubtless they are not uncommonly put down as *febricula*. ..... The recognition of this group comes through one of two ways. They may show characteristic signs, ... *or be recognised only through the routine Widal reaction.* .....We are not sufficiently impressed with the importance of this group. Keeping their frequency in mind, the physician will watch more closely *and have the agglutination reaction tried more frequently* in patients with mild fever. ..... *For the community the recognition of this group is most important* ....."

If the foregoing statements were valid before the introduction of protective inoculation, much more are they so in relation to the character of enteric infections in inoculated persons, among whom the relative proportion of mild, abortive, and atypical attacks will naturally be higher than among non-inoculated individuals. Thus it appears that in urging the importance of relying on agglutination tests for diagnosis in such cases one is not guilty of ignoring clinical observation, but can claim the strong support of clinical teaching.

That the facts thus indicated were quite fully recognised by experienced observers who have worked upon the epidemiology of enteric infections is illustrated in the subjoined quotations from an article by Grattan and Wood[6] on paratyphoid fever in India, where the case is stated plainly and with great cogency.

"In the first place, owing to the mildness of the disease in some instances, patients are not diagnosed paratyphoid, but influenza, tonsillitis, pyrexia of uncertain origin, rheumatism or pneumonia, with the result that they are sent out of hospital within a few weeks of going sick, and may return to barracks while still infectious. In the second place, such convalescents are frequently sent with other debilitated men to the hills during the hot weather, and thus the hill stations where men of several corps mix together may serve as distributing centres of the disease. Furthermore, the ambulant case is in reality ....."

"An epidemic is started from one acute carrier, the nature of whose illness is not recognised owing to its mildness. He infects other men, some of whom are recognised as cases of paratyphoid; others, again, are not diagnosed, and possibly others never report sick at all. These men soon return to barracks and come in contact with other men in soldiers' homes, &c.; and though probably only infectious for a few days manage thus to disseminate the disease."

With regard to the interpretation of agglutination results, Captain Garrow expresses so clearly exactly what ought to be done in carrying out an investigation of this problem that his terms may well be quoted (italics partly mine):—

"..... blood culture should be performed at once. ..... Whatever the result of the blood culture, agglutination tests by a strictly quantitative method should be performed and repeated at suitable intervals. ..... The object of this procedure in a case in which an absolute diagnosis by blood culture has been obtained is ..... to furnish *agglutination results controlled by blood culture. The data so obtained are essential as a guide to the interpretation of agglutination results in other cases* in which blood culture has failed to give a diagnosis ....."

But Captain Garrow appears to have overlooked the fact that this fundamental work is precisely what has already been done on a very considerable scale. And there comes a time in the conduct of investigation when the evidence accumulated seems to be sufficient to convince observers that the guide thus obtained may be relied upon, and that the problem may in certain aspects be regarded as solved. Now the evidence obtained by Dreyer[7] and his co-workers in very long series of cases is that *in every case* bacteriologically proved to be typhoid or paratyphoid B, and also in similar cases of paratyphoid A (since the low level of agglutinin titre found even at the maximum in many cases of this infection was fully recognised), the diagnosis independently arrived at by means of agglutination tests carried out by Dreyer's method was *proved* to be correct. Results of such a character may fairly be termed a *uniformly accurate diagnosis.* They would seem to justify my statement—not in the extravagant interpretation placed on it by Captain Garrow "that agglutination tests alone *invariably* furnish an *absolutely infallible* diagnosis"—but in the form in which it was made, and with the limitations carefully specified in the article, that such tests "..... can be made to yield a uniformly accurate diagnosis in cases examined during active infection." The limitations specified and repeated from a previous article by Dreyer and myself[8] were that a diagnosis should not be based on a rise of titre of only 100 or 200 per cent. if it is clear that the maximum of that rise falls markedly outside the period sixteenth to twenty-fourth day of the disease. We further stated that so far as experience at present goes, if a regular rise and subsequent fall, even of only 100 or 200 per cent., occurs in the typhoid (or paratyphoid) agglutinin titre of the serum, and its maximum

clearly falls between the sixteenth and twenty-fourth day from the onset of illness, the case is likely to be one of typhoid (or paratyphoid) infection. It would be prudent, therefore, that it should be so regarded under present conditions, when the circumstances are such that it is a prime object to prevent the escape of undetected carriers. For every case that is missed is a potential carrier of infection.

Captain Garrow further takes exception to my use of the graphic method in joining successive points on the charts of agglutinin titre by *curved* lines, which he terms "figments of imagination." Here he is rather led astray by a telling phrase. It is, of course, in one sense never possible to do more than speculate (more or less logically) regarding the course of nature between points of observation. One was therefore careful to speak guardedly of these interpolations as "curved dotted lines ..... *to indicate approximately the probable form* of the agglutinin curve." But it is surprising that Captain Garrow should express a desire to see the points jointed by *straight* lines. For a little more consideration would have shown him that such straight lines would not only equally be figments of imagination, but they would also be deliberately *misleading*. If there is one fact more than another that has been firmly established for years, it is that both the rise and fall in the agglutinin titre of the serum follow *curves*. Why, then, draw straight lines if one wants to illustrate what one thinks is probably occurring between points of observation?

To turn briefly for a moment from the general to the more particular. Captain Garrow very properly draws attention to a bad slip of the pen in a recent article by Professor Dreyer and myself in stating the maximum of a curve lies between the two highest readings, when we should have said on one side or other of the highest reading. But, as he notes, the correct principle is followed in my charts. In reference to Chart 6, in which the T. estimations exhibit a progressive fall, the reason why a maximum is placed between the first two readings is that, as can be seen at once by plotting out on a large scale, a smooth curve through the last five points will not pass through the first. Incidentally, this shows how information is gained from the use of *curved* lines of interpolation. In Chart 10 the reason for the diagnosis "clearly a case of B. infection" is given in the letterpress attached, if read in conjunction with the whole of note 3.

Case 4 of my article receives some special criticism. In publishing this chart attention was drawn to the fact that the case had "simulated a tertian ague." It was selected for publication partly to illustrate the fact (see Osler and McCrae above) that such cases may be *mistaken for malaria*. The clinical data given were a headache, a shivering fit accompanying the first sharp rise of temperature, and two more sharp rises of temperature on the third and fifth day (though without definite chills). The blood was examined for malarial parasites, but none were found, and a *typical typhoid agglutinin reaction was observed*, as shown in the chart. On this evidence Captain Garrow regards the case as one of malaria, but it is quite impossible to assent to such a diagnosis. The patient came from the Mediterranean area, where he had had prolonged fever, associated with severe intestinal disturbance, and he appears to have suffered, at any rate, from paratyphoid A and paratyphoid B infections (mixed or consecutive; *vide* chart). There was no indication of malaria in his history, and he had been three months in England when he was seized with the brief pyrexial attack under discussion and developed an extremely characteristic typhoid agglutinin reaction of moderate grade. Captain Garrow writes in a way that might convey the impression that he supposes every brief tertian periodicity of pyrexia with a chill at the onset to be necessarily of malarial origin. But he is, of course, aware that this is not the case. Repeated chills may occur, with or without marked periodicity, in various stages of enteric fever (to go no further afield) *vide* Osler and McCrae, loc. cit., p. 115, where a chart of enteric fever is given, *showing seven successive periodic chills* (cp. also Osler and McCrae, p. 105, and Allbutt and Rolleston's "System of Medicine," 1905, vol. i., p. 1108 and p. 1132).

III.—Captain H. Graeme Gibson's letter in THE LANCET of Jan. 13th, 1917 (p. 78), follows quite a different line of criticism. In effect the letter pointedly suggests that Dreyer, Ainley Walker, and A. G. Gibson [9] have ignored or are ignorant of (it is not clear which is intended) certain earlier work, which had proved long before the same facts as they imagine themselves to have established more recently. In doing so it, of course, tacitly admits that the facts in question have become established, and on this account its appearance marks an important stage in the gradual crystallisation of opinion regarding the diagnostic value to be attached to systematically repeated and exact agglutinin determinations. But Captain H. G. Gibson is entirely mistaken in his conclusions.

Medical science is deeply indebted in very many directions to the admirable studies carried out by officers of the Royal Army Medical Corps, and it is a matter of particular regret to the present writer that he is compelled—not, be it noted, by any claim or action on the part of authors themselves, but by the misleading charges advanced (however disinterestedly) by Captain H. G. Gibson — to bring under criticism work which constituted at the time a valuable and successful endeavour to advance knowledge in regard to enteric infections, particularly in the domain of epidemiology. This task, which is not undertaken lightly, is rendered personally somewhat less repugnant by the fact that, whatever share may be assigned to his co-workers, any results which may have been attained by the Oxford School of Pathology are pre-eminently due to the scientific insight and experience of my friend and colleague Major Dreyer, now absent on active service.

The statements contained in Captain H. G. Gibson's letter may now be dealt with. Dreyer, Ainley Walker, and A. G. Gibson did not ignore the earlier work referred to.

1. There is no suggestion in any of the authorities whom Captain H. G. Gibson quotes either of the need for accurately quantitative measurement of agglutinin titre, or of a technique and materials by means of which such measurements could be made.

2. Nor is there either the statement, or the evidence to prove it, that reliable diagnostic data can be secured by the systematic repetition of exact agglutinin determinations at appropriate intervals—three to five (or more) successive determinations at intervals of from three to five days.

3. The curves reproduced by Captain H. G. Gibson marked no new departure in pathological investigation. For accurately determined curves of agglutinin titre had been published, at any rate since 1902, by Madsen and Jörgensen, Dreyer and Schroeder, Widal, Dreyer and Ainley Walker, and others, before the appearance of the communications referred to, and were presented in greater detail and with more exacitude.

4. The problem of the diagnosis of enteric fevers in inoculated men by means of agglutination tests became important in India and elsewhere from the period of the re-introduction of typhoid inoculation in the Army in 1905, but it remained unsolved, although the key to its solution had been provided in the work of Madsen and others just mentioned and in the improvements in technique devised by Madsen and by Dreyer.

5. As regards the observations of Grattan and Harvey [10] and Grattan and Wood,[6] *we made reference to them* where they were germane to the purpose in terms of which the opening sentence ran as follows":—

"It is in absolute agreement with the important and careful observations carried out by Grattan and Harvey, and Grattan and Wood some years ago in their investigation of paratyphoid fever in India."

6. As concerns the quotations taken from reports on the enteric fever depôt at Naini Tal, they do not represent the views which we maintain. Had we referred to them it could only have been to express our very strong dissent from a number of their conclusions—for example:

Naini Tal Reports.	*Comment.*
"In paratyphoid fever the Widal reaction is *invariably* raised for the *B. typhosus*."	It is not *invariably* raised.
"In all cases of fever in inoculated men the blood should be taken *near the beginning* and *towards the end* of the fever. If the two results are the same the case is probably not enteric."	This is not necessarily true, for a marked rise and fall in titre may have occurred between two such distant determinations. We regard three determinations as the normal minimum. And we should consider it quite deplorable to wait until towards the end of the attack before attempting to secure a diagnosis.

In opening his criticism Captain Gibson takes exception to a statement of ours which offered a very moderate presentation of the facts existing at the time when it was written (December, 1914). He states that since 1905 repeated observations of the serum agglutinin content have been

taught at the Royal Army Medical College "*and carried out* by Army bacteriologists." But the first sentence of his own quotation from the Naini Tal reports throws an interesting light upon the latter claim, and in itself goes far to justify our statement.

Statement by Dreyer, Ainley Walker, and Gibson.	*Naini Tal Report.*
"It is probable that the absence of accurate diagnosis in the past explains the fact that statistical results arrived at in our Army have *not always* been so convincing as would otherwise have been the case."	"Some of these *errors in diagnosis* are due to the fact that the men had been inoculated, and therefore their blood gave a positive Widal reaction, and they were *diagnosed enteric fever on the strength of this alone.*"

Captain Gibson then proceeded to urge that—

"The necessity for using Dreyer's technique ..... is not apparent, and equally reliable results can be, and have been, obtained when using *living* suspension of bacilli, '*provided the suspension is standardised.*'"

This shows that the writer has failed to understand what is meant by *standardisation of the agglutinability* of a bacterial suspension. The standardisation of the agglutinability of living suspensions is no doubt theoretically possible, but for any practical and routine purpose it is quite out of the question. Indeed, one is almost driven to the hardly credible conclusion that, with Dr. Panton, Captain Gibson supposes the determination of a given opacity or number of bacilli present per c.c. of the suspension to constitute the "standardisation" of an agglutinable culture.

At the end of the letter a case is stated against Dreyer in error, and with a degree of injustice which might have been avoided had the writer studied more attentively the authorities he quotes. He points out that Grattan and Wood mentioned in 1910 the frequency of *low* titre of serum in paratyphoid A, and would appear to suggest that Dreyer was still ignorant of this fact in 1915, although Grattan, Dreyer, and Wood had been working together. This suggestion is based on Dreyer's statement that "for a considerable time I did not know *how low* is the agglutination given by paratyphoid A in certain cases." But the explanation lies in the meaning of the words "*how low*" and in their context. Grattan and Harvey[10] found in 7 of their 8 cases "*low* dilutions (20 to 40), and always incomplete." Grattan and Wood[6] mentioned that they *had seen* cases where the agglutination did not reach 1 in 10. Their statement with regard to diagnosis in paratyphoid A is given below, along with the *context* of Captain Gibson's quotation from Dreyer.

Grattan and Wood[6] (1910).	*Dreyer[7] (1915).*
"..... a positive agglutination for this organism in a dilution of *1 in 20* is, in our opinion, *very strong evidence* of the nature of the patient's fever."	"One had always taken *1 in 25* as the limit below which no positive diagnosis should be made. But in the case of paratyphoid A that is wrong. If one uses standard cultures, and follows the technique laid down for their employment, I am now convinced that an agglutination of *1 in 10* is for all practical purposes *diagnostic* in cases of paratyphoid A.

This (1 in 10) was *the degree of lowness* of titre for positive diagnosis, of which Dreyer (and everyone else) was previously unaware. And no one had ever before suggested that paratyphoid A could be diagnosed with certainty (in non-inoculated and T-inoculated persons) on so low a titre. So far was the fact from being already familiar that Leishman[11] was even then unable to accept it, remarking with regard to this conclusion of Dreyer, "Personally, I think he goes too far because of the very low dilutions to which he attaches importance." Dreyer, Grattan, and Wood worked in association for a considerable period, and ample time has passed since Dreyer's statement was made for Grattan and Wood themselves to have drawn attention to any infringement of their priority had such existed. It can constitute no breach of confidence of any kind to state that Lieutenant-Colonel Grattan and Captain Wood were the first officers in the Royal Army Medical Corps to recognise fully the value of Dreyer's method and to make use of it consistently.

References.—1. Panton: THE LANCET, 1916, ii., 750. 2. Ainley Walker: THE LANCET, 1916, i., 17. 3. Glynn: THE LANCET (Correspondence), 1916, ii., 877. 4. Garrow: THE LANCET (Correspondence), 1916, ii., 1037. 5. Ainley Walker: THE LANCET, 1916, ii., 896. 6. Grattan and Wood: Journal of the R.A.M.C., xvii., 148. 7. Dreyer: Proceedings of the Royal Society of Medicine, 1915, Medical Section, p. 10. 8. Dreyer and Ainley Walker: THE LANCET, 1916, ii., 419. 9. Dreyer, Ainley Walker, and Gibson: THE LANCET, 1915, i., 324. 10. Grattan and Harvey: Journal of the R.A.M.C., xvi., 9. 11. Leishman: Proceedings of the Royal Society of Medicine, 1915, Medical Section, p. 19.

AN EASY AND RAPID METHOD OF

DETECTING PROTOZOAL CYSTS IN FÆCES BY MEANS OF WET-STAINED PREPARATIONS.

BY ROBERT DONALDSON, M.A., M.B. EDIN., F.R.C.S. EDIN., D.P.H.,

BACTERIOLOGICAL SPECIALIST, WAR HOSPITALS, READING; PATHOLOGIST, ROYAL BERKSHIRE HOSPITAL, READING, ETC.

IT is of the highest importance to single out from among those previously infected or exposed to infection the small but dangerous minority who form the little band of *histolytica* carriers. This involves the expenditure of an enormous amount of time on the very necessary routine examination of all suspected fæces in order to detect the presence of protozoal cysts, more especially those of *Entamœba histolytica*. To fix and stain films from each of the large number of specimens requiring examination is impracticable owing to the amount of time involved.

The usual method of detection is to examine wet preparations, which is done, as a rule, in one of the two following ways. Having determined the existence of cysts by their higher refractility in a wet film preparation of fæces in normal saline, another similar film is made in which, however, the saline is replaced by Gram's iodine. This method obviously involves the making of two separate films. In the alternative method the first step as above described is omitted, and only a wet Gram's iodine preparation examined. The object in using iodine is to bring out sufficient detail—more particularly the nuclear structures—in order to differentiate between cysts of *Entamœba coli* and *histolytica* respectively.

These methods are open to two important objections. The first, involving as it does two separate preparations, takes up too much time. In the second place, as the iodine in both methods stains the food débris more or less deeply, there is not sufficient colour contrast between the cyst and the débris surrounding it to enable it to be singled out rapidly and with certainty. Where cysts are very few in number, even an expert at such examinations may miss the occasional cyst on which a diagnosis alone may rest, while those less expert must spend a considerable amount of time carefully scrutinising everything in the film, and even then will probably frequently be in error. The lack of contrast in such preparations where there is so much similarly stained material to distract the eye, necessitates considerable concentration on the part of the observer, involving a greater expenditure of time and labour, and consequently allowing a greater loophole for error.

In order to reduce the amount of time spent on such examinations to a minimum and to render it almost impossible for even a novice to fail to detect the presence of cysts, I have devised the following stain mixtures. After trying various proportions, it has been found that a mixture of equal parts of the two stains used in any of the three following combinations will yield the best results.

A. Five per cent. aqueous solution of KI saturated with iodine to which is added an equal volume of either—

B. (1) A saturated aqueous solution of rubin S; or
(2) A saturated aqueous solution of eosin; or
(3) Stephens's scarlet writing fluid.

(*Note.*—1. I have found it necessary to specify this particular brand of red ink as some brands are useless for the purpose. 2. Basic fuchsin cannot be used.)

A few loopfuls of one of the above stain combinations are placed on a clean slide, a loopful of fæces taken and rubbed up with the stain to form a fairly smooth suspension, and a clean cover-slip gently lowered over the drop. To get the best possible definition it cannot be emphasised too strongly that the film so made should spread out under the cover-slip by capillarity so as to form the thinnest possible layer—preferably a layer which is no thicker than the diameter of a *coli* cyst. Obviously no gross particles must be left in the film, otherwise the cover-slip will not lie flat. The exact amount of stain to place on the slide will soon be learned after one or two attempts, and will depend on the size of the platinum loop employed and the size of the cover-slip. It is also preferable, although not essential, to mix afresh for each day's use the two elements of the combination stain.

I wish to point out that the way in which the film is made is a point of considerable importance, especially where rubin S or, to a less extent, eosin has been used in the combination; for if the layer of fluid between the slide and cover-slip be too thick the superfluous film of fluid overlying the cyst tends to render the latter less bright. In the case of cysts of the size and shape of *E. coli* or *histolytica* this makes very little difference, but if one is hunting specially for cysts of *Lamblia intestinalis*, and still more of *Tetramitus mesnili*, the colour contrast is not so marked owing to the smaller size of the cysts and the consequent thicker red layer of fluid overlying them. Where the worker has not acquired sufficient dexterity in making such a film, the difficulty may be got over by his using rubin S or eosin of only half saturation in the stain combination, or by employing the scarlet writing fluid above mentioned. In this way the effect of the super-imposed deeper red is to some extent obviated.

Another point to be noted is that where pressure has been applied to the cover-slip to cause the film to be spread out, many of the cysts, especially those of *Entamœba coli*, will be seen stained red by the red element of the stain combination. This is due to the fact that the cystic sphere is very easily ruptured, thus allowing the red stain to penetrate. Close examination of such red cysts will invariably demonstrate some rupture in the continuity of the cyst wall, which, as long as it remains intact, prevents the penetration of the red dye. Outside such cysts part of the contents or one or two nuclei can often be seen lying more or less closely apposed to the rupture. While the vivid contrast between cyst and background is not so marked as in the case of non-ruptured cysts, it is nevertheless almost impossible to miss recognising them, as they stain a deeper tint of red than the surrounding background, while the nuclei are just as distinct and as easily demonstrated as in the unruptured cysts. It is here not a question of the cyst being degenerated, but merely of the healthy cyst being ruptured. With the eosin or ink combination such a cyst stains a bright cherry-red, while with the rubin S combination it is more of a terra-cotta tint.

In a wet preparation stained according to the above directions, there is a more or less homogeneous red background from which the cysts stand out as brilliant yellow or greenish-yellow spheres which even the veriest tyro cannot miss seeing. Such cysts have a very sharply defined outline which in the case of *coli* and *histolytica* cysts appears, in the rubin S combination, using daylight as the illumination, as a sharp deep purple ring. In the case of other cysts this well-recognised outline is not so deeply coloured, although it is still tolerably sharp. The nuclear structures in the cyst stand out as prominently as with the old simple iodine method. Of course, where the light is too strong it may be necessary to close the iris diaphragm slightly to bring the nuclei into relief.

The method of stain which I here recommend is not, I need hardly say, a stain which will allow of a differentiation between cysts of *Entamœba coli* and *histolytica* respectively. The various points which, in doubtful cases must be considered before a definite opinion can be given, must be gone over in specimens treated with the above stain combination equally as in the simple Gram films. Where the examiner feels that it is necessary to measure the diameter of the cyst in order to differentiate between *E. coli* and *histolytica* respectively, the wall of these two types of cyst is so sharply defined and so prominent—as above mentioned—that with an eye-piece micrometer measurement is easily and accurately made, inasmuch as the halation seen in simple Gram-stained preparations is completely eliminated.

Although it is not pretended that the new stain combination can be definitely used as a means of distinguishing between cysts of *E. coli* and *E. histolytica* respectively, there are one or two points about the staining properties which, to one who has examined many specimens, suggest the possibility of differentiation, although I am not prepared to say at present that in every case these can be relied on solely. In the case of cysts of *E. coli* and *E. histolytica* and of the so-called iodine bodies, to take the cysts most likely to require differentiation, there is to the practised eye a slight shade of difference in the colour-tone of the first two as compared with that of the iodine body. There is a less vivid colour in the case of *histolytica* as compared with *coli*, which is the most brilliant object of all in the field with the exception of plant hairs. With a low power the nuclei of *coli* cysts are easily seen as a rule, while those of *histolytica* are less evident. The iodine body appears less vivid than the *histolytica* cyst, probably partly by reason of the large iodine-stained masses which it contains. Its luminosity is less. Even with a low power, however, it is easy to differentiate the so-called iodine body from *histolytica* or *coli* cysts, inasmuch as the first-named shows a well-defined round body at one pole which stains a very intense brown colour. Its outline is so sharply defined and its depth of colour so intense that it is easily differentiated from the immature *coli* or from the *histolytica* cyst, which happens to contain a vacuole which takes up the iodine stain. Such a vacuole is rather diffuse, has no sharply-marked outline, and is such a faint brown tint that its margins seem to shade off into the surrounding colour of the cyst. Another point of difference between the so called iodine body and the cysts of *coli* and *histolytica* is that the outline of the first-named is not represented by such a definite and sharp deep purple line.

There is an indication also of a slight difference between cysts of *coli* and *histolytica* respectively on close examination of the contents. Cysts of the latter type seem to present a slightly more granular appearance than those of *coli*. This lessened granularity in *coli* cysts may partly account for their extremely vivid brilliance. In this connexion it is interesting to note that the granularity of the so-called iodine bodies appears to resemble that of *histolytica* cysts, and this together with one or two other points might suggest some definite relationship between the two. I do not, of course, mean to say that because of this one supposed similarity the so-called iodine bodies are to be regarded as *histolytica*.

It is to be noted that apart from using a combination stain mixed fresh each day it is also of importance to see that too much food débris is not used to make the film preparation. Where this precaution is neglected the iodine may be all absorbed by the gross matter present, leaving the cysts perfectly colourless. A little practice in making just the correct type of film will obviate this.

The only other objects likely to be met with besides protozoal cysts which take on this vivid greenish-yellow are plant hairs and a few mould spores. The former, described in a former paper,[1] are easily recognised for what they are, while the latter can be differentiated from cysts by their shape or size and by the absence of the characteristic markings of the various types of protozoal cyst. The vivid colour of plant hairs suggests that the walls of these protozoal cysts are composed, like the plant hair, of cutin. *Blastocystis hominis*, on the other hand, always stains a cherry-red or terracotta colour according to the stain combination used. The large vacuole which is here contained takes on the same tint as the background, while the nuclei pushed to the side stain deeply, as described in the last sentence. They are of vegetable origin and possess very thin walls, and with the combination stain described in this paper it is impossible for them to be confused with true protozoal cysts, as is sometimes done by the inexperienced when the simple iodine stain is employed.

What are probably dead leucocytes stain apparently varying tints of brown to greenish-yellow. All the other débris takes on a more or less brownish tint, while bacteria remain practically unstained, or, if they do stain, the deep red background in which they are prevents them, owing to their size, from becoming obtrusive and so distracting to the eye.

The background, therefore, in such preparations is a more or less homogeneous shade of red according to the kind of stain combination used, in which the bacteria, for the reasons given above, do not force themselves on the vision, while the larger particles of débris, owing to their tint, do not obtrude themselves on the eye. The only objects which stand out in such glaring contrast with this background are the protozoal cysts especially those of *coli* and *histolytica*, plant hairs, and to a less extent the iodine bodies, and a few mould spores.

I wish here to emphasise the need for employing the strong solution of iodine above mentioned in the stain combination. Even in preparations made with iodine alone, this will be found to be a great improvement on the ordinary Gram strength iodine, as nuclear and other details are much more strongly brought out.

The tint of the background varies according to the stain combination used. Rubin S necessarily gives the deepest red, eosin is deep with rather more yellow in it, while the Stephens's scarlet writing fluid is similar to the eosin but less

[1] THE LANCET, 1916, ii., 1100.

intense and a more marked yellowish-red. To get the best colour contrast between background and cyst wall it is a matter of great importance to take into consideration the source of illumination used. Much the best contrast is got by using the rubin S combination stain with daylight as the source of illumination. Failing this, white artificial light, and failing this, a deep blue screen must be inserted below the diaphragm in the case of the eosin and the ink combination stains respectively, in order to cut off the yellow rays.

With ordinary strong daylight the rubin S combination gives a rose-red tint to the background, while with either of the other combinations the background is a sort of salmon-pink. From all, the cysts stand out a brilliant greenish-yellow, although the contrast is not so marked the yellower the background becomes. The best contrast effect can, however, soon be determined after a little manipulation by each individual worker for himself, who must bear in mind the points mentioned above regarding depth of film, and so on.

I wish in conclusion to express my thanks to Mr. R. C. McLean, M.A., B.Sc., of University College, Reading, for much valuable help in connexion with the above.

Summary.

The stain combinations here recommended are devised for the purpose of detecting protozoal cysts in general and more particularly those of *E. coli* and *E. histolytica*, but they are not intended as a means of discriminating between *coli* and *histolytica* cysts respectively, although there are some indications that this mode of staining may aid in the differentiation. To get the best results attention must be paid to the various points mentioned. The advantages claimed for the above technique are these:—

1. One or other of the stain combinations can easily be obtained and rapidly made up.

2. The detection of cysts and their identification are carried out in one and the same preparation.

3. The contrast in colour is so striking that the cysts cannot be mistaken for anything else and the veriest tyro cannot fail to detect them if present. The possibility of missing a carrier is reduced to a minimum.

4. Without using too thick a preparation, it is nevertheless possible to use slightly more fæces at one examination than by the simple iodine method. The cysts can be picked out quite easily even in a thick clump of débris, and this is not always possible in a simple iodine preparation.

5. Where doubt exists as to whether a particular cyst is to be classified as *coli* or *histolytica*, accurate measurement—formerly considered a point of crucial importance but no longer to be relied on—is facilitated, since the effect of halation is practically eliminated.

6. The method above described reduces considerably the time spent on such examinations, a point of some importance where many specimens have to be examined in a day. A positive film even in the hands of the less experienced can be recognised at once, while a negative film may be labelled so with certainty inside two minutes.

7. Where the observer is hunting specially for the smaller cysts, such as those of *Tetramitus mesnili*, the Stephens's ink combination may be found preferable, although it does not give such a definite colour contrast with the larger cysts. In all cases the film made should be the thinnest possible, and the source of illumination should be taken into account.[2]

[2] Since writing the above the Director of the Wellcome Research Bureau has kindly given me a reference to a wet-stain method described by Kuenen in a paper, "Sur la Dysentérie Amœbienne," published at Saigon in 1913. In this paper the stain used was a single one, either eosin, methyl-blue, or iodine by itself. Eosin alone, as recommended in this paper, is poor, and not even as good as iodine alone.

Reading.

ROYAL VICTORIA HOSPITAL, BELFAST.—At the annual meeting, held on March 29th, it was reported that during 1916 there had been 3487 intern and 28,413 extern patients, a daily average of 518 patients, in the hospital, and that over 2200 operations had been performed. Though the annual subscriptions have increased, it is estimated that an additional sum of £5000 will be required during the current year, owing to the continued rise in the cost of materials. Five members of the medical staff are at present at the front. A bequest of £10,000 from the estate of the late Miss Kennedy was announced.

TOXIC SYMPTOMS AFTER THE USE OF BISMUTH PASTE.

BY F. A. HEPWORTH, F.R.C.S. ENG.,

TEMP. MAJOR, R.A.M.C.; CHIEF RESIDENT SURGEON, WHARNCLIFFE WAR HOSPITAL, SHEFFIELD.

IN view of the increased use of bismuth paste and its great value in the treatment of infected wounds, I venture to publish the result of an investigation into a number of cases suspected of poisoning which have occurred in the surgical wards of the Wharncliffe War Hospital, Sheffield.

Five men have been found to show symptoms suggesting plumbism, and although under the care of different surgeons and in different wards they are alike in suffering from severe septic wounds and in the fact that all were treated by the application of bismuth and iodoform paste (B.I.P.P.) according to Professor Rutherford Morison's technique. This paste has been in use here from September, 1916, and is still being used. The method was very kindly demonstrated to me by Professor Morison in November, and has been proved to be very beneficial.

Up to Nov. 3rd the paste was prepared from bismuth carbonate, which was afterwards tested, and no lead contamination discovered. After Nov. 3rd a new lot of bismuth subnitrate was used, as in Professor Morison's formula; this stock lasted for about four weeks, and it was among the cases treated during this period that those suspected of poisoning occurred. Unfortunately, the subnitrate was used up before the symptoms had been noticed, and the drug was therefore not analysed. Since the beginning of December, both bismuth carbonate and subnitrate have been used, and both have been examined and declared lead-free by Staff-Sergeant F. C. Thompson, D.Sc., R.A.M.C. The method of testing is added to this report as a separate note. The drugs have all been obtained from the base medical stores at York.

In this report seven cases are included, all of which were treated by the Morison method; they represent all the most severely wounded and most septic cases treated with the bismuth paste at that time. Many slighter cases were similarly treated, but none showed poisoning. Of the seven cases, five had symptoms of poisoning, and two were free.

In the accompanying table, which gives details of the cases, it will be seen that four patients developed a *blue line on the gums*. This was first noticed in Private Y., who complained of a sore mouth 10 to 14 days after his operation, and was found to have a broad band of bluish pigmentation inside the cheeks, and on the sides of the tongue, as well as an unusually thick line on the gums. Other patients were then examined and three more were found with less noticeable, but still distinct "blue lines"—Sergeant R., Private B., and Private D.

Anæmia was present in all seven cases, and disappeared as the wound is healed. *Constipation* was especially noticeable in Private Y. Both symptoms are so common among men with severe wounds that they are of little diagnostic value. No neuritis, wrist-drop, colic, or headache has been noticed. *Mental stupor* was a troublesome feature in one patient (Private D.), but had been developing before his treatment with bismuth paste.

Loss of sphincter control, delirium, and sleeplessness continued for two or three weeks in the case of Private J. B., who was extremely ill and thought to be dying. His infection was severe and his knee-joint was involved. Improvement followed, not directly after amputation, but as the suppurating amputation wound cleaned up. His symptoms, therefore, may have been due to plumbism, but are much more likely to have been caused by septic intoxication or iodoform poisoning.

Blood changes were looked for by our pathologist, Major A. E. Naish, R.A.M.C. (T.), but no granules were found in the corpuscles. The *urine* was also examined for lead, but no trace found in any case.

Opinion was, at first, strongly in favour of the view that the symptoms in these patients were due to lead absorption, especially as the cases occurred while one particular batch of bismuth preparation was in use. But in Sir Thomas Oliver's book on "Lead Poisoning," p. 135, it is stated that—

A blue line on the gums, with difficulty distinguished from that caused by lead, may be observed in persons to whom large doses of bismuth have been administered by the mouth; or who, as the subjects of empyema, have had injected into the fistulous track in their thoracic wall bismuth emulsion.

DETAILS OF CASES, INCLUDING THOSE WITH TOXIC SYMPTOMS AFTER USE OF BISMUTH PASTE.

—	Disease.	Date of wound.	Severity and character of wounds.	Date of operation and application of B.I.P.P.	Date of symptoms.	Severity and character of symptoms.
Pte. Y.	G.S.W. both legs. Double amputation in France.	July 7, 1916.	Large granulating flap wounds at level of knees.	Double re-amputation. Dec. 5, 1916.	Dec. 16 onwards.	On Dec. 16, 1916, complained of sore mouth; had broad blue line on gums and cheeks Dec. 20. Constipation; no colic; anæmia. Wounds healed by Dec. 30.
Pte. D.	G.S.W. left thigh. G.S.W. left foot. Comp. fracts. of femur and tarsal bones.	Aug. 6, 1916.	Both wounds severe. Much suppuration. Fractured femur in bad position.	Nov. 17, 1916.	Dec. 20.	Blue line on gums, Dec. 20th. Mental stupor on Dec. 1st, but had been difficult to manage and stuporose to less extent during early part of November. Anæmic all the time. Wounds healed by Jan. 7th, 1917.
Pte. M.	G.S.W. left shoulder. Fract. of greater tuberosity of humerus. Joint involved.	Oct. 25, 1916.	Wound pouring with pus. Temperature 103° every evening.	Nov. 12, 1916.	—	No toxic symptoms. Steady improvement.
Pte. B.	G.S.W. right thigh. Comp. fract. femur. G.S.W. left wrist.	Nov. 10, 1916.	Septic wounds. Femur comminuted.	Nov. 27, 1916.	About Dec. 20.	Well-marked blue line on gums. Anæmic (but was so before operation).
Sgt. R.	G.S.W. right shoulder. Fract. of greater tuberosity of humerus. Joint infected.	Nov. 13, 1916.	Deep wound tracking behind joint, and under scapula. Septic.	Nov. 27, 1916.	About Dec. 20.	Pyorrhœa alveolaris, with thin blue line on gums. Transient anæmia.
Pte. J. B.	(a) G.S.W. left buttock. (b) G.S.W. left thigh. Comp. fract. femur. Knee-joint infected.	Nov. 16, 1916.	Infected, but well treated by Carrel method. Bone projecting into supra-patellar pouch of knee.	(1) Nov. 27; (2) Dec. 14.	Dec. 4th and later.	No blue line on gums. Delirium; sleeplessness; high temperature; loss of control over sphincters. All these symptoms were considered to be due to septic infection.
Pte. H.	G.S.W. right thigh. Comp. fract. of femur.	Sept. 15, 1916.	Track through thigh from side to side. Septic. Bone comminuted.	Oct. 27, 1916.	Nil.	No toxic symptoms. Progress in this case was much better after the use of the bismuth paste. He had shown practically no improvement previously.

And in our cases, with the exception of the "blue line," no typical symptom of plumbism has been present, although with so intense a blue line as occurred in the patient, Private Y., other symptoms might reasonably be expected to occur. In view of the importance of a correct diagnosis it is very unfortunate that none of the bismuth preparation used in treating these particular cases was obtained for chemical examination.

I desire to acknowledge the help of Major Naish, Mr. M. H. Phillips, and Dr. J. C. Maddison in the investigation and treatment of the cases referred to.

Method used for detecting a trace of lead in bismuth carbonate or subnitrate, by Staff-Sergeant F. C. THOMPSON, D.Sc., R.A.M.C.—The usual tests for lead are useless. When dissolved in nitric acid, lead can be precipitated as PbO_2 on the anode of an electrolytic cell, while bismuth goes to the kathode. The following method, which is simple, very delicate, and requires no special apparatus or skill, has been worked out for the purpose.

Dissolve 5 grammes of the bismuth compound in 10 c.c. of concentrated hydrochloric acid. Dilute until bismuth oxychloride is just precipitated, and re-dissolve in a few drops of HCl. Filter if necessary through a *dry* funnel into a dry beaker. Add 3 c.c. concentrated sulphuric acid, cool and add an equal bulk of alcohol, and put aside. 0·07 per cent. Pb gives a milkiness in about five minutes. 0·02 to 0·03 per cent. Pb gives a faint milkiness in about four hours.

THE RELATION OF STRUCTURE TO FUNCTION AS SEEN IN A MECHANISM OF THE VENOUS SYSTEM.

BY F. WOOD JONES, D.Sc., M.B., B.S. LOND.,
PROFESSOR OF ANATOMY, LONDON SCHOOL OF MEDICINE FOR WOMEN.

IT is difficult to imagine that the arrangement of the venous system, to which attention is directed in this note, can have escaped the observation of anatomists and physiologists from the time of Harvey onwards. When once the cardinal facts of the circulation of the blood had been demonstrated it is beyond belief that any mechanical aid towards the efficiency of the circulation should have escaped notice. But recorded observations upon this particular detail have not so far been encountered in the literature; and it is to be remembered that a just conception of the mechanism of venous return came relatively late in the story of unravelling the mysteries of the circulation.

That John Hunter had no note upon it, in such of his manuscripts as are lost to us, is difficult to believe. But had the observation ever received common currency it is unlikely it would have escaped the attention of the Rev. William Paley, nor could it have failed to furnish material for a Bridgwater treatise. However, this particular phase of anatomical literature does not dwell upon the detail to which attention is here directed, and this silence is shared by modern text-books on anatomy and physiology. It is this fact which alone justifies publication to-day. That a search of the literature has not revealed an exposition of a simple mechanical contrivance in the animal body is my excuse for publication, but I would apologise in advance to such eighteenth century philosophers as may have appreciated and recorded the conditions in works which I have, so far, overlooked.

The primary tubular elements of the vascular system are primitively pulsatile, and this pulsatile power is manifested at an extraordinarily early period. Not only is the first formed heart-tube capable of contraction and dilatation, but every mesoblastic muscular cell of the primary tube is endowed with an inherent power of rhythmic movement. By this power, aided by a secondary valve system, the blood is urged onwards to distal parts of the body. But when the blood, so urged, has come to the end of the outgoing arterial system and enters upon its meandrine pilgrimage of the tissue spaces it loses, little by little, this propulsive *vis a tergo*. Yet from its tissue wanderings the blood still has to find its way along the veins upon its return journey to the heart.

It is obvious that, under normal circumstances, this journey has to be undertaken in the absence of any effective pulsatile propulsion from the heart. Many mechanical aids may come to the assistance of the returning venous stream. In the first place, since pulsation is so inherent a property of embryonic vascular channels, it might be expected that pulsatile veins should not be unknown; and, as a matter of fact, their existence has long been demonstrated, and the occurrence is highly instructive. In 1851 Professor T. Wharton Jones[1] first noticed pulsation in the veins coursing in the membrane of a bat's wing. On the average the veins contracted 10 times every minute, and these contractions, aided by a system of valves, were seen under the microscope to propel the blood onwards towards the heart. Such a striking phenomenon at once arrested his attention, and formed the subject of a series of communications to the Royal Society. The circumstance also demanded an explanation, and Wharton Jones suggested that such an arrangement was necessary in the bat's wings, since they "on account of their extent are, as regards their circulation, in a considerable degree, though not entirely, beyond the sphere of the heart's influence." This explanation may be partly satisfactory, but it cannot wholly account for the phenomenon. Many structures as far removed from the

[1] Discovery that the Veins of the Bat's Wing (which are furnished with Valves) are Endowed with Rhythmical Contractility, and that the Onward Flow of Blood is Accelerated by Each Contraction, Phil. Trans., Feb. 5th, 1852.

sphere of the heart's influence could be cited, and pulsatile venous channels in these structures would be sought in vain. The peculiarity of the veins of the bat's wing membrane lies in the fact that they course in an outlying part of the body which is totally unprovided with muscles capable of exerting pressure upon them. In the absence of skeletal muscle masses in this very specialised manus the pressure which urges the blood onwards must be furnished by the muscle of the veins themselves, and the primitive pulsatile possibilities of vascular channels is called into being.

That the pressure exerted by surrounding skeletal muscular masses is the chief agent in propelling venous blood along the veins is not to be doubted, and this fact is recognised by every physiologist. It is the purpose of this note to point out that in this method of producing venous return structure is related to function in a very striking manner.

We may make a generalisation, which amounts to the statement of a definite law of animal economy, that (1) *venous channels which run their course in the midst of muscle masses are multiple;* and that (2) *when emerging into intermuscular spaces these plexiform vessels unite to form single channels again.* This might be translated into the terms of anatomical nomenclature by saying that arteries are accompanied by single veins in intermuscular spaces, but are accompanied by irregular and multiple venæ comites when passing in intramuscular planes.

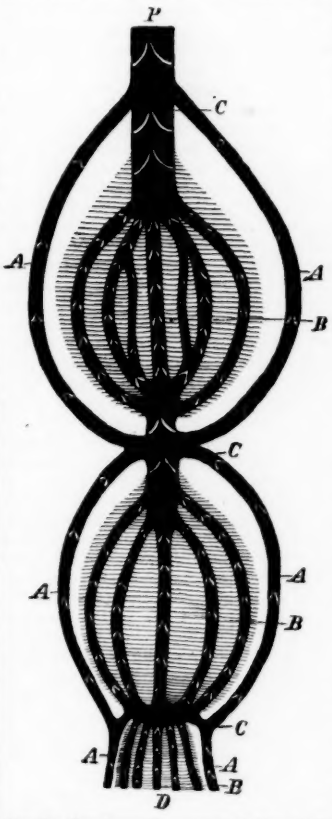
This is a very simple arrangement, but it has led to many complications in anatomical nomenclature. Anatomists rather despise venæ comites, since they are irregular and variable channels, and in many cases these venæ comites are but ill-described and often they are not named harmoniously with the terminology employed for the accompanying artery. The anatomical purist prefers a discrete and constant channel to which to assign a definite name. Instances could be multiplied to weariness, but it will be enough to point to the radial and ulnar veins which have no precise anatomical relation to the like-named arteries, which are themselves accompanied by venæ comites. The radial and ulnar veins are, properly, the complex venous channels which accompany the radial and ulnar arteries in their course among the muscles of the forearm. This question of nomenclature will not be proceeded with further; the purely functional meaning of the arrangement will alone be dealt with.

It is obvious that if blood is to be squeezed back to the heart by the pressure of muscular masses the most efficient mechanical disposition will be achieved by a large series of venous channels containing a large amount of venous blood becoming subjected to pressure whilst lying in the midst of contracting muscle masses. We may say that in the interstices of muscle groups there is a valved venous sponge which is squeezed by the muscles when they undergo contraction. But muscle groups have a definite disposition and spaces exist between the groups—notably at the flexor surfaces of the joints in the limbs—and in these spaces no pressure is exerted. In these spaces the meshwork of venous channels gathers itself together again and forms a single tube, and this tube is invariably equipped with well-developed valves. The sponge is emptied by muscle pressure into this tube and the return of the blood is made impossible by the presence of the valves. In a simple mechanical way the intramuscular venæ comites may be likened to the bulb of a syringe which is compressed by the muscles; the single-valved channel to the valved nozzle of the syringe.

Now, it is to be noted that this arrangement may be several times repeated upon the course of an individual venous channel, the repetition occurring as often as the conditions of subjection to muscular pressure and freedom from this pressure may recur. In the limbs, for instance, there is an intramuscular pressure sponge, or syringe bulb, in each segment, represented by the complex, deeply seated venæ comites of the named arteries. In the flexor intermuscular space over each joint is a single, valved channel or syringe nozzle. The blood is therefore squeezed from stage to stage by the pressure of a series of reservoirs connected up in line, as one might imagine a linked series of Higginson's syringes.

It is at once apparent that such is a highly efficient mechanism when limbs, or parts, are moved in orderly and leisured fashion, segment by segment. But if the whole limb or part be thrown into a state of contraction or if the contraction of the several segments follow one another with great rapidity the several groups of deep intramuscular veins may be compressed simultaneously or in very rapid succession. Such a state of affairs would lead to a blockage of the venous return from the part. In order to meet this demand a second system of superficial veins, which are not subjected to muscle pressure, is called into play. We may make a second generalisation and state that—*at all those points at which the deep intramuscular veins become freed from pressure and appear as single, valved tubes there are connecting, valveless branches between the deep and superficial veins, and at each of these points an alternative course is offered to the blood.*

When the muscles of the next segment nearer the heart are relaxed the blood will return by the deep intramuscular veins, gaining an added impulse by the next contraction of the muscles, but when these muscles are contracted it can pass by the superficial veins to the next discrete channel beyond the contracted muscle mass. It is not necessary to press this matter further, since its simplicity is self evident and a diagram is added to render the details more obvious.



Purely diagrammatic representation of the venous circulation of a limb. *A*, Superficial (subcutaneous) veins. *B*, Veins (in shaded areas) which run in the midst of muscle masses. *C*, Single channels in the interspaces between the muscle masses of different segments. *D*, Distal extremity. *P*, Proximal extremity.

One or two simple outcomes of this arrangement are, however, worthy of notice.

When the muscular system is entirely relaxed, as in sleep, the heart will propel blood to its distal arterial ramifications, but the absence of muscular contractions will impede its return to the heart; venous blood will, therefore, tend to accumulate in the relaxed distal parts. In this way a large proportion of the blood of the body may become lodged in the venous system. Upon waking this blood must be returned to the heart to ensure the proper arterial supply to the brain and other organs. It is for this reason that muscular contractions of the limbs—the familiar stretching — accompany the waking of such animals as sleep lying down in a state of muscular relaxation. Yawning, by causing a suction in the thorax and a compression of the abdomen, attains the same ends. The blood is squeezed home from outlying parts into the cavities of the body, and finally to the heart. It is noteworthy that animals which do not lie down to sleep, or do not thoroughly relax their muscles in sleep, do not stretch or yawn when waking.

One other effect is of peculiarly human interest. If the legs are dependent, but are not engaged in any special muscular activity, venous blood will tend to gravitate into the veins. The deep intramuscular veins are supported by the muscles and cannot overfill, and there will therefore be a tendency for the superficial veins to become distended with blood. This is the etiology of varicose veins in sedentary persons. On the other hand, if the intramuscular veins are vigorously and continuously compressed by muscular action, the burden of returning the venous blood will again be thrown upon the superficial veins. This is the etiology of varicose veins in athletes.

A NOTE ON THE

IMMEDIATE AFTER-TREATMENT OF THE GUILLOTINE AMPUTATION STUMP,

AND THE PREVENTION OF SECONDARY HÆMORRHAGE.

BY H. F. WOOLFENDEN, F.R.C.S. ENG.,
CAPTAIN, R.A.M.C. (T.C.);
AND
J. CAMPBELL, M.D. LIVERP.,
CAPTAIN, R.A.M.C. (S.R.)

THE guillotine amputation stump usually arrives in the base hospital with a not inconsiderable amount of retraction of the skin, more especially after it has been treated for several days without any effort being made to prevent the retraction. Any extension applied to the skin in order to be really effective should commence immediately after operation, be continuous, and result in a more or less complete covering in of the stump. These ends seem to be most satisfactorily attained by the following method, which we have used for a long time in such cases in the hospital with which we are connected.

On the completion of the amputation each of the quadrants of skin is perforated with the knife by a pair of stab incisions about 1 inch apart and 1½ inches from the edge, and a loop of sterilised tape 10 inches long is passed through each pair of perforations (as shown in the diagram) so that the tension is borne by the surface of the skin when the loop is pulled on. The loops of tape are gently pulled down by the assistant and the stump is dressed and firmly bandaged. After this the stump is placed in an ordinary Thomas knee or arm splint and supported in the usual fashion. The loops of tape are then attached to the end of the splint by fairly stout rubber tubing tightened to the required degree and altered from time to time. Any subsequent dressing can readily and easily be accomplished without slackening the extension by merely removing the dressing from between the loops of tape. On the second to the fourth day the tapes are removed and the extension is kept up by strips of crinoline bandage. To the edge of one end of each strip are attached a pair of ordinary metal hooks. These pieces of bandage are glued to the skin by collodion with the hooks placed about 1 or 2 inches from the skin edge. A loop of tape is then passed round the hooks and rubber applied as before. The hooks and collodion are best changed every two or three days. It is most important that the skin should never be allowed to retract when changing the soiled hooks; this can be prevented by an assistant keeping the skin drawn down. The object of the elastic extension is to maintain a continuous pull on the skin as it stretches under the extension.

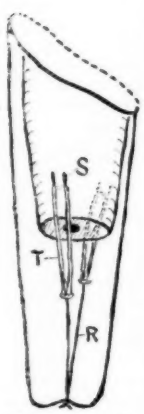


Diagram to show method of applying skin extension to the guillotine amputation stump. S, skin incisions; T, tapes; R, rubber tubing.

By the above means every guillotine amputation can be easily transported, nearly every stump almost completely covered in when discharged to England (more especially if short flaps of ¾ inch to 1 inch have been made at the time of the operation), the stay of the patient in hospital considerably diminished, and the necessity of subsequently shortening the stump obviated, or at any rate the amount of bone requiring removal much lessened. In addition the stump is considerably steadied, with consequent greater comfort to the patient.

It is our invariable practice to *raise the head* of the bed, so that the amputation stump looks slightly downwards. By this means tracking of sepsis along the fascial planes, so frequently seen when the stump is raised, becomes of quite rare occurrence. The pain of subsequent dressings is largely obviated by spreading out a single layer of gauze over the raw surface of the stump, and then packing the dressings on its surface, or by the use of gauze soaked in glycerine.

The writing of this note has been suggested during the last few weeks by the arrival in hospital of quite a large number of guillotine amputations in which no effort at all has been made to prevent skin retraction. No originality is claimed, as extension in some form to the flaps has been used in France for some time; but this method has the advantage that the extension can be maintained during transit by train or boat.

Secondary Hæmorrhage from the Main Artery in Amputation Stumps.

During the treatment of very many amputations which have been done in casualty clearing stations and in this hospital there is one slight modification of the orthodox method that has suggested itself to us. The cut artery in many instances is found to have retracted about ½ inch above the level of the cut muscles. The pocket so left becomes the seat of suppuration and the source of infection, which extends some distance upwards along the outside of the artery. This localised suppuration persists for some time after the rest of the stump has become healthy, and is a very common cause of secondary hæmorrhage from the main artery. Moreover, when such hæmorrhage occurs the difficulty of re-ligaturing the artery is increased on account of its retraction.

What happens is, we think, the following. The fleshy part of the limb is cut through by one sweep of the knife. Owing to its elasticity the artery retracts. It is then seized by the forceps, pulled down, the tissues round it cleared, and the artery tied and let go. It retracts a little further and the opened-up fascial plane becomes the seat of suppuration round the end of the artery. To obviate this we have made a practice of exposing the artery about 1½ inches below the level at which we intend to divide the muscles. We then divide and tie the artery and vein at this level, so that when the amputation is completed the vessels are projecting out from the stump. By this means the incidence of secondary hæmorrhage from the main vessels has, we think, been very much lowered, and in the few cases in which it has occurred it has been very much more easily dealt with, as the end of the artery can be readily re-ligatured without the necessity of further incision.

The occurrence of secondary hæmorrhage in wounds generally.—Another very fertile source of secondary hæmorrhage is the leaving of a stiff rubber tube in contact with a large arterial trunk after the operation of draining a wound, with the almost certain result that ulceration of the vessel occurs, followed by fatal hæmorrhage in many cases. It would at first sight seem unnecessary to point this out, but we can recollect very many patients coming down from the casualty clearing stations with large rubber tubes pressing against their femoral or brachial arteries. These have always been immediately removed, but only too frequently the damage has already been done, and within a few days dangerous and often fatal hæmorrhage takes place from the eroded artery.

Medical Societies.

MEDICAL SOCIETY OF LONDON.

Traumatic and Arterio-venous Aneurysms.

A MEETING of this society was held on April 2nd, Lieutenant-Colonel D'ARCY POWER, the President, being in the chair.

Colonel CHARTERS J. SYMONDS, who opened the discussion, said that whilst many cases of arterio-venous aneurysm had been submitted to operation since the war began, others had remained untreated; it would be very valuable to see both groups and so modify the views currently held. His experiences had led him to correct some of his former views. The most interesting form of aneurysm was that in which there was a communication between an artery and a vein, either direct or by the intervention of a sac. In some the communication was set up within a few hours of the trauma; in others there was considerable delay. He asked for experiences as to the secondary effects of aneurysm, such as were alluded to by Sir George Makins and by Dr. Bernheim, of America, especially cardiac and circulatory di-abilities. The local condition in some varix aneurysms was important; in those involving the common femoral artery and the profunda femoris there was enormous dilatation of veins, so that they looked like sinuses running through the

muscles. The difficulty in arresting hæmorrhage in these was very great. After giving particulars of a number of these he proceeded to discuss the treatment. In aneurysm of the posterior tibial artery the disability was very slight; this was also true for those at the bend of the elbow. When an aneurysm existed at the base of the skull, so that the patient was kept awake at night and had nerve disturbance in consequence, it was advisable to operate. Sir George Makins's view was that aneurysmal varices seldom required operation. He described by means of diagrams the various operative procedures which had been devised for aneurysm and the degree of success which had attended them in his own experience. Gangrene was a serious danger in operations on the common femoral; in the South African War it occurred in 50 per cent. according to Makins. In aneurysms below the middle of Hunter's canal his experience was that gangrene did not follow ligature of the vessels. With regard to arterio-venous aneurysms Sir George Makins was strongly of opinion that these should be left for from two to three months to consolidate and contract and to permit the establishment of a collateral circulation. But the speaker suggested that it might be wiser to operate on them early, in the same way as upon a wounded artery, thus avoiding the trouble due to adhesions which followed passive waiting. Procedures which might be useful were temporary ligature of a large artery through the abdomen or compression of the common iliac artery by a band of deep fascia being sewn over it or using a portion of saphena vein sufficient to encourage early collateral circulation. In aneurysm of the carotid there was danger of the supervention of hemiplegia, one or two examples of which he related. He thought that much could be said in favour of operating earlier than Sir George Makins advocated. The formation of adhesions and the development of a large number of thin-walled vessels, which were particularly hampering if the operation indicated was suture of the aperture in the artery, had to be taken into account.

Major R. H. JOCELYN SWAN spoke of the need for distinguishing between arterial hæmatoma and arterio-venous aneurysm. By the former was meant a collection of fluid blood and clot contained under pressure in the muscular and fascial planes of the limb into which blood is forced from a laceration in the wall or complete severance of an artery or a large branch of it. The clot might become softened by direct infection from the external wound, when secondary hæmorrhage might occur, or, as was more common, the surface wound healed, whilst the impact of the circulating blood hollowed out a cavity in the recent clot, which by organising formed a more or less thick-walled laminated sac with smooth inner lining, resulting in a pulsating swelling and forming the false or traumatic aneurysm. At the same time, as the result of infiltration of the tissues by serum and leucocytes, a good deal of matting and fixation of the sac occurred and the anatomical lines were obscured, conditions which caused difficulty when an attempt was made to remove the sac at an operation and might render the main vessel hard to find at some distance from the aneurysm. An arterio-venous aneurysm implied a wound both of the artery and vein, with a communication between them. This might be direct—aneurysmal varix. This simple form was uncommon; it was more common to find an aneurysmal sac at the distal side of the artery in addition or a sac lying between or on a side of both artery and vein, with which both communicated. In some cases the sac seemed to be formed mainly from the venous injury. An arterio-venous aneurysm might not be noticed for some weeks or months after the injury. Of the recently published cases of aneurysm following gunshot injuries, of 146 which were operated upon, 106 were false aneurysms and 40 of the arterio-venous variety. In his own 23 cases 16 were false and 7 arterio-venous. With regard to situation, 40 occurred in the upper extremity and 90 in the lower, 12 of the remainder being in the carotids. The proportion of arterio-venous to false aneurysms was greater in the larger vessels; in the femoral it was 14 to 31, in the popliteal 8 to 21, in the posterior tibial 2 to 13, whilst in the axillary it was 3 to 9 and in the brachial 2 to 14. In the neck there were 8 arterio-venous aneurysms to 4 traumatic. The physical signs of arterio-venous aneurysm differed from those of false aneurysm. The bruit, which might be systolic at first, became a more continuous rumble, and was conducted more widely both along vessels and bones. The thrill was coarser and bubbling and often appreciated by the patient. The swelling of a varicose aneurysm was usually smaller and less defined than that of a false aneurysm. Dealing with treatment, he advised delaying operative procedure for some weeks unless untoward symptoms, such as gangrene, rapid increase in the size of the swelling, or increasing pain from pressure upon nerves, should force one's hands. In most cases of arterial hæmatoma he advised complete rest in the hope that the whole might consolidate, whereas if a traumatic aneurysm developed it could be dealt with subsequently. If an arterial hæmatoma were opened it might be very difficult to pick up the injured vessel, whereas a proximal ligature of the main trunk at the seat of election was to be avoided, for not only had the collateral circulation been given little chance of establishing itself, but also it might be seriously interfered with by the pressure of the mass of blood-clot in the tissues. Further, the hæmorrhage might proceed from a large branch and not from the main trunk, while ligature of the main vessel might determine the onset of gangrene in the limb. When a false aneurysm was present the patient should be kept at rest with slight pressure on the swelling and the latter carefully watched for any increase in size. Although operative treatment would generally be necessary, it should be deferred, if possible, until all wounds were firmly healed and collateral circulation had had a good chance of becoming established. The difficulties were lessened rather than increased by waiting. If the swelling had not appreciably diminished in 6 to 8 weeks, if signs of increase were present, or if pain from nerve pressure became marked, operation should be undertaken. In most of his operations he had been obliged to abandon an attempt at suture and to rely upon obliteration of the vessel by ligature. The operation should aim at reconstructing the lumen of the injured vessel by suture; when this was not feasible, ligature immediately above and below the injury should be carried out and the sac emptied and obliterated by suture. It was neither advisable nor necessary to attempt removal of a large sac. By opening the sac one made certain that no branch led into it which would keep up the aneurysm. In arterio-venous aneurysm operation would seldom be required for direct fistula. When the artery and vein were in communication through a sac, operation was needed, owing to the gradual increase in size of the swelling. He believed that ligature of both the artery and the vein, above and below the aneurysm, would be found to be the best that could be done where immediate suture was impracticable.

Major W. MCADAM ECCLES remarked that Colonel Symonds thought it would be well not to wait before operating on arterio-venous aneurysm and ordinary traumatic aneurysm, whilst Major Jocelyn Swan thought it wise to wait. He believed that both were right. In the case of aneurysm in the neck he considered that the sooner one operated the better; but when the situation was one of the limbs, it was right to wait for collateral circulation to be established. So far he had not had a case of gangrene of the lower limbs, because he had waited for months in these cases.

Captain J. R. LEE, of the Australian Forces, expressed his firm belief in combining the operative treatment with the administration of a vaccine to counteract the lighting up subsequently of pathogenic organisms. Where it was possible, preference should be given to an autogenous vaccine. He agreed as to the wisdom of waiting in cases of aneurysm of the limbs. He did not agree with leaving the sac, as there was evidence that it was apt to become canalised.

Captain C. ROWNTREE considered that aneurysmal varix with a direct arterio-venous fistula was, on the whole, better left alone, especially as it caused but little trouble. It was a different case with the indirect variety. Suture was very rarely possible, though it should be aimed at. It would be useful to learn the proportion of cases of successful suture. One could not always be certain whether a condition was aneurysmal varix or varicose aneurysm, and in some cases it was essential to incise and explore before deciding whether it should be left alone or operated upon.

Dr. MILLER thought, as the result of watching many cases, that when an aneurysm was near nerve trunks, if the surgeon was willing to operate, he should do so at once. With regard to tying the common carotid, he believed that hemiplegia occurred only when embolic material found its way into the brain.

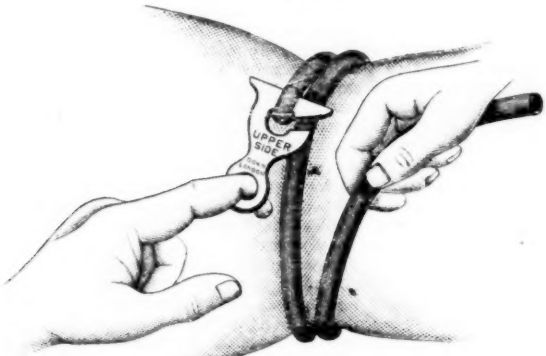
Colonel SYMONDS and Major SWAN replied.

New Inventions.

A NEW TOURNIQUET.

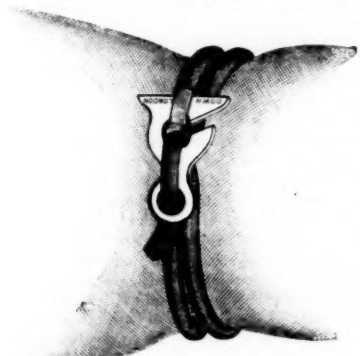
THE question of tourniquets, both in war surgery and in operations on the extremities, has been rather prominent recently, and some correspondents to THE LANCET have advocated the use of pneumatic tourniquets. It is obvious, however, that these are not suitable either for the arrest of severe hæmorrhage or the compression of a large artery such as the femoral, though they may be satisfactory for the compression of veins to facilitate the intravenous administration of drugs, such as salvarsan and its substitutes. What is required in the design of a tourniquet is simplicity of application, strength, and security. The fastening which is here depicted has all these merits. It consists essentially of a shaped metal plate (see illustrations) with a wide base and two circular openings. One of these is complete, whilst the other is split so that the rubber tubing which supplies the elastic compressing force can be slipped into it.

FIG. 1.



Method of application.

FIG. 2.



Applied.

The method of application is as follows:—

The left forefinger should be hooked through the complete ring (Fig. 1) and the plate held on the upper aspect of the limb, whilst the first turn of the tourniquet is passed round and under the limb and beneath the metal plate. The base of this is then pressed down on the rubber so that it is held secure, while the right hand is again passed beneath the limb to apply the second turn of the tourniquet with sufficient pressure to obliterate the arterial circulation. When the circular outline of the tubing becomes flattened by forcible stretching it can easily be slipped through the lateral slot in the proximal opening, the size of which is calculated to prevent the escape of the tube. Any subsequent slipping of the tourniquet is then guarded against by threading the tubing through the complete ring (Fig. 2) and pulling it tight. Two turns of the rubber tubing are sufficient for the lower extremity, and in the case of the arm the necessary compression can easily be obtained with a single turn. It is, of course, necessary to protect the skin of the limb in the usual way with a fold of lint or other soft material.

I have used this new tourniquet in a number of cases with complete satisfaction, and the necessary manœuvres to apply it take longer to describe than to carry out. I have been agreeably surprised to find that an inexperienced dresser can apply it successfully when no instructions at all have been given to him.

Three points should be especially noted:—(1) The complete ring is for the forefinger of the left hand, where it should remain till the tourniquet is in position; (2) by pressing the widened base on to the first turn of the tube around the limb all loss of tension is avoided; and (3) the slot of the incomplete ring should be directed towards the right hand of the surgeon, and to ensure this one aspect of the metal plate bears the words "upper side."

I am much indebted to Messrs. Down Brothers, St. Thomas's-street, London, S.E., for the care with which they have carried out my design.

JOSEPH E. ADAMS, M.S. Lond., F.R.C.S. Eng.,
Devonshire-place, W. Captain, R.A.M.C. (T.)

A SPLINT FOR THE WRIST-DROP OF RADIAL NERVE PARALYSIS.

THIS splint, a description of which is supplied by Mr. Bryden Glendining, F.R.C.S., was originally extemporised by a member of the firm of Henry A. Murton, Ltd., surgical instrument manufacturers, of Newcastle-on-Tyne, who was serving in the Army and was invalided from the front. He became a patient in the Duchess of Bedford's Woburn Military Hospital, and designed the appliance to meet his own case. The splint is made of aluminium, and consists of wrist portion (Fig. 1), moulded and shaped to adapt itself to the volar surface of the wrist and lower ends of the radius and ulna, and attached by a webbing strap and buckle; and palmar portion (Fig. 2), which is shaped and cut out for the hand, and at the same time is capable of extension, whereby it can be lengthened or shortened according to the size of the hand, or according as it is desired to carry the support to the metacarpo-phalangeal joint only, or to the first inter-phalangeal joint, a fly-nut in the splint locking the sliding surfaces and fixing the apparatus at the required length. Between the wrist and palmar sections the splint is hinged and fitted with two strong wire springs, which act in the direction of dorsal flexion, so that, unless counteracted by action on the part of the wrist and hand flexors, the position assumed is constantly that of hyperextension. The support is not carried beyond the first inter-phalangeal joint, since it is considered more beneficial for patients to exercise the fingers by means of the lumbrical muscles attached to the back of the extensor tendons over the first phalanges.

FIG. 1.

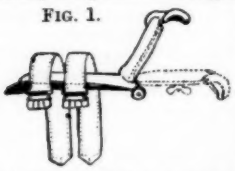
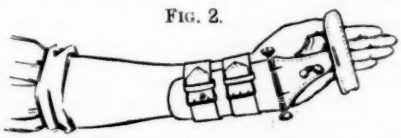


FIG. 2.



The advantages claimed for this splint are its small bulk and lightness, and the increased pleasure which patients derive from being able to use the arm and hand during convalescence. It has been generally adopted at the Woburn Military Hospital.

THE LANCET.

LONDON: SATURDAY, APRIL 14, 1917.

The Health of the People.

SOME 90 years ago the social and economic conditions in England, grievously affected by the Napoleonic wars, produced a feeling among many of the more far-seeing, who were also blessed with a humanitarian sense, that the health of the people ought to be a national care. Even though that feeling took outward form mainly in designing methods whereby the ills of the poor, as far as they were the outcome of disease, should not spread to the population at large, there existed behind it a consciousness that eradication of those ills, rather than a lopping of their branches and a topping of their shoots, ought to be effected. In short, the need for making the health of the people the care of the State had become obvious to those who could read with a sympathetic heart the signs of the times; and from this position to that of to-day, when by common accord we welcome the foundation of a State Department of National Health, seems but a short step—certainly one that should not have required 90 years of consideration. But to come to this conclusion is to forget that only a few people grasped the signification of the conditions in which a large proportion of the population were struggling; that the removal of those conditions was in most cases beset with the difficulties everlastingly associated with established custom and vested interests; and that the science of medicine had not acquired a familiarity with the etiology of disease that could enable its professors to preach the doctrine of prevention with sufficient authority either to arouse the public conscience or reinforce the voice of reform.

The Poor-law Commissioners of 1834 perceived that ill-health was a principal source of pauperism, and that the removal of the causes of ill-health ought to be a more economical proceeding than the treatment of its consequences, and early public health legislation contained the germ of a National Health Department; but the nation—its units no more than its rulers—did not appreciate the splendour of the work which was beginning, resenting only the manifest drawbacks to legislation conceived, with however sensible an object, in the wrong spirit. None the less the work went on, for men were growing more liberal-minded; and as medicine, leaping forward in bounds to accurate knowledge, became first an official aid and then an inspiriting counsel to further effort, sections of the community became alive to the fact that in various directions they could be relieved of masses of evil, to whose pressure they had hitherto resigned themselves. They learned that by sanitation there could be removed barriers to their health and happiness, which remained erect with no better apology than could be found in their antiquity; and, as each section was aroused, it made its claim for relief heard, with the result that the remedy best fitting the circumstances was applied. Schemes of reform initiated in this haphazard manner were entrusted for their carrying out to various departments of Government and various local authorities, with a consequent overlapping of jurisdictions and waste of energy and money, while the resulting confusion has been worse confounded by the creation of new Government bureaux and the rearrangement of local administrative machinery. The outcome has been to make the care of the health of the people, as conducted in this country, a magnificent and illogical muddle, in which fine ideas and accomplishments, many of which elicit the envy of modern civilisation, are blended with the opportunities for extravagance and dissipation of strength inevitably associated with the want of a central plan. All this has been for many years perfectly obvious to the medical profession, as well as to men and women whose public life has brought them into contact with the truths of our social existence. With them the feeling has been implicit that the health of the people, being a national asset, should have the national supervision of a State department. And now the whole nation, under the stress of war, sees eye to eye with them.

The Unionist Social Reform Committee has, therefore, put forward at a very apposite moment a well-written pamphlet[1] on the subject of the health of the people, which unravels in clear terms the intricacies of the position. The writers, deliberately leaning to the economic side of their arguments for a thorough reorganisation of our care of the health of the people, demonstrate with figures the appalling loss in man-power suffered by a nation which takes no heed to the health of its members. This loss they translate coldly into terms of money, mentioning sums that even in these times, while our ears learn of millions being spent daily in the conduct of the war, are so enormous as to challenge the attention of all. And, incidentally, it may be of considerable value to future progress that the popular mind should have been familiarised with the necessity of paying colossal sums to achieve worthy ends; poor we all shall be after the war, but we shall have learnt the lesson that great efforts are worthy of great sacrifices, and shall be ready to start a campaign against disease with the open-handedness which has marked our military procedure, and, let us hope, with less grounds for the reproach of waste and disorder. A State Department of National Health is imminent, and, from the details so far made public, it seems safe to assume that in the new bureau full recognition will be accorded to the work and claims of private practice. Whatever prevention may do for the health of the people in bulk, the sick will have to be treated in detail; and it will be excellent that those practitioners who have to make good the places

[1] The Health of the People: A New National Policy. A Report of the Unionist Social Reform Committee. London: Argus Printing Company, E.C. 4. 1917. Price 3*d*.

where the defences have broken down, or to confirm on their patients the outcome of scientific investigation, should possess the same central authority as those carrying out the work of prevention or research. In this way there will be a community of interests between the official and the private doctor from which the public will benefit.

"Soldier's Heart."

THE articles which have recently appeared in our columns, as well as the letters published in this issue, bear witness to the interest taken in the subject of "disordered action of the heart" in soldiers. The Medical Research Committee has now published a report by Dr. THOMAS LEWIS of the investigations made by himself and his colleagues at the Mount Vernon Hospital, Hampstead, which the Committee has lent to the Army Council for the purpose. No name yet suggested for the condition is quite satisfactory. A considerable number of cases returned originally as valvular disease of the heart have been included in this report, as further examination showed that they did not present convincing evidence of organic disease, and therefore came within the scope of the inquiry. As the condition is not unknown among civilians, the term "soldier's heart" is not really applicable, and as there is no proof that it is primarily cardiac any such name as "disordered action of the heart" is neither accurate nor advisable. For the impression that he is suffering from disease of the heart retards the patient's recovery. Dr. LEWIS prefers the non-committal term of "effort syndrome," though this label probably will not gain general acceptation. He considers the leading symptoms, in order of importance, to be breathlessness, præcordial pain on exertion, exhaustion, giddiness, and fainting. He notes, as of less importance, palpitation, headache, lassitude, irritability of temper, insomnia, shakiness, and flushing. A disinclination to take alcohol in any form (sometimes for conscientious reasons, but as commonly for reasons of distaste) is to be reckoned a frequent and remarkable association. The characteristic signs on examination he classifies as follows: Increased heart-rate, with an exaggerated response to emotion, exercise, and posture. The response of the systolic blood pressure is similarly exaggerated, and in patients who are up and about high readings are often obtained. A diffuse apex beat and irregularity of the heart's action, increased by deep respiration, are not uncommon. Fleeting disturbances of temperature may be observed, and quickened respiration is the rule after exertion, but may also occur in the resting state. Coldness, blueness, or wetness of the palms and soles is frequent. Tremor of the hands is the rule. Deep reflexes are usually exaggerated. The urine is hyperacid and the output of calcium is increased, chiefly in the form of calcium oxalate crystals. Spermatozoa are very common in the urine. There is an increase of white corpuscles in the blood to 12,000 per c.mm. on the average, the increase being chiefly in the lymphocytes. The alteration of the blood lies in the deficiency of those salts, which, acting as buffers, ease the shock to the reaction caused by the addition of acids or alkali. In their absence the acids evolved by muscular exercise tend to irritate the respiratory centres.

In dealing with the cases at the Mount Vernon Hospital a preliminary sorting eliminated the cases of early phthisis, frank exophthalmic goitre mitral stenosis, aortic regurgitation, and aneurysm. In Dr. LEWIS'S opinion the great majority of those patients who have merely systolic murmurs at apex or base prove not to have valvular disease. He regards auscultation as the least valuable method employed in this sorting. As to this, Dr. ALEXANDER MORISON'S protest against the modern contempt for cardiac murmurs demands consideration; if it is true that not long ago we exaggerated the significance of murmurs, that is not to say that nothing is to be learnt from their detection. A second sorting of the cases was then carried out by more detailed inquiry and by the response to graduated exercises. Where the symptoms dated from rheumatic fever or there had been recurrent rheumatism the men were not regarded as suffering from effort syndrome. Dealing with the remainder, Dr. LEWIS reports that malingering in the sense of simulation of the full symptoms of the malady is very rare, but conscious exaggeration of symptoms is almost certainly common. Of 93 patients, only 2 wished to return to active service, 41 wished for home service, and 50 for discharge from the Army. No doubt this mental attitude influences recovery. A valuable point that has been determined is the high incidence of the condition among men who were formerly in sedentary occupation. There is real necessity for more tender methods in the initial stages of training the conscript who for years has been accustomed to take no exercise. The frequency with which the symptoms develop during convalescence from febrile and intestinal affections suggests the desirability of a graduated system of re-training in such cases, while rest in bed, Dr. LEWIS holds, should be avoided at all stages of treatment, except in instances of severe præcordial pain, severe headache, or severe giddiness. It is quite obvious why the inclination of many of these soldiers to stay in bed should be discouraged; a high proportion of them are of neurotic temperament, and self-abuse is by no means unknown among them. Occupation is clearly indicated, and light employment in the open air with graduated exercises and general hygienic measures are the best therapeutic means we have. No suggestion should be made that the heart is affected. As to drugs, bromides may be of service in the initial stages, but later they are of no avail. Digitalis is without influence in these cases, and the report suggests, therefore, that its use should be discarded; the only soldiers in whom it has a real value are unfit to remain in the Army. On the lines of treatment here described it is claimed that the duration of the incapacity is considerably reduced. The average duration of stay at the hospital is now, we understand, six weeks.

As to the cause of the condition, Dr. LEWIS'S conclusions are mainly negative. That it is particularly apt to occur in men who have lived a sedentary life and have had some form of infection he is clear; he is satisfied that tobacco is not responsible for producing it, but is also sure that it aggravates the condition, once it has been produced. Alcohol is certainly not a cause. He rejects the theories of bacteræmia, toxæmia, and hyperthyroidism. On the other hand, Dr. STRICKLAND GOODALL in a recent Chadwick Lecture considered the nervous and irritable heart to be due to a compensatory hyperthyroidism, initiated by excessive emotional stimulation of the suprarenals, and a somewhat similar view was put forward recently by Dr. LANGDON BROWN in the Hunterian Society's Oration.[1] Dr. LEWIS admits that the patients show nervous symptoms, but to a less extent than those commonly classed as neurasthenics. He concludes that "it is conceivable that the symptoms arise not from poisoning by toxic products but by products of faulty metabolism engendered by infectious disease. The same fault of metabolism might reasonably be considered to arise from chronic infections of different types." He regards the changes in the blood and urine as strongly supporting this view. We would suggest that this faulty metabolism may yet be found to be associated with one of the ductless glands, even though the thyroid may not be that one. In the course of the research at the Mount Vernon Hospital Dr. F. R. FRASER and Dr. R. MCN. WILSON have found from their observations upon apocodeine and adrenalin that the sympathetic nervous system is more easily stimulated and also more easily depressed, but whether this is due to hypersecretion of the adrenal glands has not been determined. In this connexion the effect of acute infections in exhausting the chromaffin material in the adrenals is certainly suggestive.

[1] THE LANCET, Feb 24th, 1917, p. 293.

THE LATE MR. LEONARD GEORGE BOOR.—There died recently at Nelson, N.Z., in his ninety-second year, Mr. L. G. Boor, who was educated at Christ's Hospital, London, and received his medical training at Westminster Hospital, where he was house surgeon in 1851. In the following year he took the M.R.C.S. Eng., and practised in London till 1854, when, his health failing, he went to New Zealand, and, after a short experience of farming, accepted in 1870 the appointment of surgeon to the Nelson Hospital and Asylum, which he held for 27 years. Mr. Boor was an enthusiastic supporter of the Volunteer movement, and was a brigade-surgeon in the New Zealand Defence Force, taking part in 1881 in the Parihaka Expedition against the Maoris, and receiving in the following year the Imperial Volunteers Decoration. He was a prominent Freemason.

THE CANCER HOSPITAL.—At the recent annual meeting Colonel J. W. Webber, who presided, said that at the beginning of the war accommodation was placed at the service of the War Office and many soldiers had been treated by massage and electrical means and their return to service facilitated. In the research department important investigations had been carried out. During 1916 798 new cases were admitted to the wards, an increase of 20 on the preceding year, while new out-patients numbered 1519 as compared with 1424 in 1915. The total attendances of out-patients had increased from 16,154 to 23,922, and the daily average number of beds occupied was 90, or an increase of six on the preceding year. The financial statement showed a deficit of £9165 on the working expenses. Mr. Charles Ryall, chairman of the medical committee, said he thought that no hospital had suffered more by the depletion of its honorary medical staff than the Cancer Hospital.

Annotations.

"Ne quid nimis."

CHILD MORTALITY.

IN a supplement to the forty-fifth annual report of the Local Government Board Sir Arthur Newsholme, medical officer of the Board, has analysed the causation of deaths occurring in England and Wales during infancy and in the next four years of life. The statistics relied upon are those of the years 1911–1914, practically the four years immediately preceding the war. He cites the shuddering figures of infantile mortality in some of our crowded centres, and proves by their contrasts offered in other centres, as well as in rural areas, that increased organised endeavour would save for the country a large proportion of the sacrificed babes, as well as preclude the deterioration of those who emerge alive from their first year's experience of the world. In common with the report of the Unionist Social Reform Committee, he does not disguise the part played in the slaughter of the innocents by lamentable housing conditions, but without laying undue stress upon this matter alone: a reticence that has its wise side, for many men and women, anxious to play their part in helping their fellows, have been driven into the inert watching of much infant suffering by the belief that it was all due to bad housing, and that bad housing could not be bettered. This is a mode of thought that requires correction. Even in the most backward of the towns and boroughs mentioned in Sir Arthur Newsholme's black-list much saving of child-life has already been secured. The component factors producing excessive loss of child-life vary greatly in different areas, but in every area a large proportion of the total present mortality may be obviated by enlightened administrative action. Sir Arthur Newsholme does not consider the ignorance of the working-class mother to be greater than that of mothers in other classes of society, but her ignorance is more dangerous because associated with relative social helplessness. How the environment of the poor child, in its widest sense, may be levelled up towards that of the well-to-do infant is the main and closely reasoned subject of the report. With this levelling up the economic obstacles to improving the housing of the poor will disappear because the greater economy of saving lives and preventing disease will become apparent. When communities appreciate that to cure disease or to palliate its sequelæ costs in the long run infinitely more than to prevent disease in children; and when the country holds, as we believe it holds already, that the preservation of the health of the child is the duty of the people, and therefore of the State, there will be little reluctance to finding the necessary money. Let the good that has followed in a few localities upon thorough attempts to deal with the housing question, in places like Port Sunlight and Bourneville, be seen by the citizens of other localities in its real proportion, and the victory of reform will be won. All that is necessary is that the community should know on which side true economy lies, and one of the most useful functions of this report is the dissemination of accurate information, free of party spirit and authoritative in tone.

THE NATURE AND FUNCTION OF EOSINOPHILE CELLS.

THE study of eosinophilia has always been of interest to hæmatologists, and excess of it in the blood is met with in many and various morbid conditions, and gives rise to as many interpretations. The origin of eosinophile cells is equally disputable; do they represent an entity special to themselves, or are they ordinary neutrophiles which in certain contingencies, and for reasons connected with biological and pathological factors, are able to assume the character of eosinophiles? Some light is thrown on such questions by Professor R. Marchesini, of the University of Rome (*Il Policlinico*, Medical Section, Jan. 1st, 1917), who has made a study of the presence of eosinophiles in the blood and in pathological tissues, besides carrying out experiments in animals. He found that the simple fact of repeated bleedings for a long period was sufficient to produce in the bone marrow a large excess of eosinophiles, while, on the other hand, substances introduced under the skin caused evident phagocytosis but absence of eosinophilia. Thus he considers the question of the origin of eosinophile cells from the bone marrow, as true individualised cells required for special functions, to be definitely solved, and, as a consequence, that the eosinophile granules themselves are a product elaborated from the cell or its nucleus destined for functions of special nutrition or repair. The multiplicity of pathological instances in which eosinophilia is met with is evidence that it is not bound up with any given pathological process, but rather that it constitutes a special and unique reaction of the organism both in cause and effect. Eosinophilia is always present in tuberculosis, this being a disease which causes lesions in the tissues, but it sometimes seems to disappear from the circulation whenever owing to the onset of destruction of the tissues, and hence rupture and greater permeability of the vessels, the accumulation of the eosinophiles at the damaged site is facilitated. Moreover, in the most severe forms of tuberculosis their production becomes exhausted owing to the toxic and cachectic state of the whole organism and with it of the bone marrow. In benign cases of tuberculosis, where the foci remain shut off through necrosis of the vessels leading to the tubercle, the localisation of eosinophiles is rendered difficult; but if the stimulus continues, the cells requisitioned from the bone marrow remain in the circulation in readiness to penetrate wherever it is possible. Hence their noticeable presence in the circulation has a favourable prognostic import. In asthma the eosinophilia is explained by the condition of semi-asphyxia and consequent change in the broncho-pulmonary epithelium produced by the accumulation of carbonic acid, a powerful hæmatic poison; all these factors uniting in causing a profound alteration in hæmatopoiesis and a requisition *in situ* of numerous eosinophile cells. In parasitic infection the greater or less amount of eosinophiles bears no relation to the nature of the parasite, but is associated only with the lesion caused by it and the tendency in the organism towards its encapsulation. In the granulomata, malignant tumours, and intoxications by hæmatic poisons there is a tendency in the organism towards the protection and repair of the injured tissues and organs and stimulation of the bone marrow to reproduction by the presence of the foreign bodies, which have to be got rid of or encapsuled. Professor Marchesini has observed in examining sections of liver infected with actinomycosis and echinococcus that the eosinophiles which are met with in large numbers are arranged in such a manner as to prove that they contribute entirely to the formation of fibrous tissue by means of their granular secretion. In tuberculous infection of the lungs, also, the eosinophiles are most numerous where necrosed tissue has been repaired by young connective tissue. As a result of his researches Professor Marchesini believes he has found the clue to the special function of eosinophiles in the organism—namely, that they must be regarded not as simple phagocytic cells, but as nutritive and plasmic cells of a high grade, having a special secretive power for defence, and for preparing a substratum for the rebuilding of substitution tissue wherever there are toxic substances to be neutralised, extraneous matter to be enveloped, animal parasites to be encapsuled, or destruction of tissue to be repaired.

SPRUE.

THE war has not resulted in many instances of this tropical disease being seen in this country, but its general prevalence in the East and its occurrence in certain parts of Australia suggest that we must be on the look-out for cases of this nature. Therefore, we think it will be useful to refer to an excellent summary of what is known of sprue, which is given by Dr. A. Breinl and Dr. H. Priestley in the *Medical Journal of Australia* for February. Sprue is a chronic inflammation of the alimentary tract, affecting chiefly the tongue, œsophagus, and small intestine. This leads to degenerative changes, ulceration, and to atrophy of the liver. Characteristic clinical features are the passage of numerous large, frothy, clay-coloured stools, the general intractability of the diarrhœa, the intermittent course, and the progressive wasting. The cause of sprue is unknown. It was thought that because, from the tongue and fæces of most of the cases, certain yeast-like organisms could be isolated that these were the causal agents. Castellani isolated quite a number of strains, and hints that they are the responsible organisms, as do also Bahr and Ashford; but it has been shown that similar yeasts can be obtained from patients suffering from diseases other than sprue. Animal experiments have been negative. Morbid examination shows hyperæmia of the œsophagus and small intestine, as well as ulceration, especially in the lower segments of the small gut. Similar ulceration may be present in the large intestine. The liver is invariably reduced in size. The pancreas is sometimes atrophic and fibrous; at other times it is normal. The onset of sprue is insidious, and the early stages may last for weeks or months. Generally the first definite symptom is soreness of the tongue. A few small rounded vesicles of whitish colour appear on the edge and tip of the tongue; later these break down, forming shallow ulcers with ragged edges, which persist for a varying period. At the same time there is a patchy desquamation of the epithelium which may spread over the dorsal surface, leaving an angry-looking, smooth, shiny surface. In the later stages the tongue presents a complete denudation of its epithelial layer and shows longitudinal and transverse fissures which bleed easily. Gastro-intestinal symptoms dominate the earlier stages. Obstinate indigestion, distension and flatulence,

and belching of gas occur during the whole course of the disease. Diarrhœa is present to a greater or less extent throughout. The stools vary in character, but often present their characteristic appearance. Sallowness and definite pigmentation come on; the skin shows atrophic changes and becomes dry and shiny. The general aspect of the patient alters and he becomes listless, depressed, and anxious. The temperature, blood, and urine show no changes. Sprue needs to be diagnosed from pellagra and from pancreatic disease. From the latter, diagnosis may be extremely difficult, especially as there is some probability that the pancreas is actually implicated in sprue; from pellagra the differences in the skin changes offer the most certain distinguishing features. Sprue may be fatal; if contracted late in life it nearly always is so, but early cases with suitable care, and especially by removal from the endemic area, may be cured. Treatment by drugs is disappointing; emetine and collosol argentum have been tried. Dietetic treatment is required. In the early stages a rigid milk diet is the best, and an ampler diet must be governed solely by the general condition and bowel activity of the patient.

HOSPITAL TREATMENT FOR POOR-LAW PATIENTS IN IRELAND.

A CURIOUS anomaly exists in the law governing the powers of Poor-law guardians in Ireland to provide special hospital treatment for Poor-law patients. The guardians have only power to send to the hospitals for special treatment such patients as are already inmates of the workhouse. They have no power to provide any special hospital treatment for the poor patients under the care of dispensary medical officers. It has long been the custom for dispensary medical officers, who considered patients to be in need of special hospital treatment, to have them formally admitted to the workhouse hospital, and forthwith despatched to a city hospital for the required treatment. It is clear that in many cases no other procedure would have provided the required treatment in time to be of service. Up to recently, the guardians and the Local Government Board recognised this fact, and no obstacle was put in the way of Poor-law medical officers obtaining for their patients whatever treatment they thought right. A few weeks ago, however, the guardians of the Listowel union, co. Kerry, found themselves surcharged by the Local Government Board auditor for the expenses incurred in obtaining special hospital treatment for a patient who had only spent one night in the workhouse, and had not been an inmate at the moment the guardians made an order authorising the treatment. If this ruling of the auditor is to be taken as laying down a precedent, it may interfere seriously with the efficient treatment of the sick poor in Ireland.

THE ETIOLOGY OF HÆMORRHAGIC RETINITIS.

A THESIS by M. Amsler based on 164 cases of hæmorrhagic retinitis occurring in Lausanne (*Correspond. bl. f. Schw. Aerzte*, 1917, p. 318) gives an interesting analysis of the etiology of this complaint. The cases were taken from both private and hospital practice. Stated in percentages, the etiological factors were as follows: Arterio-sclerosis, 55; heart disease, 8; albuminuria, 8; glycosuria, 3; menopause, 6. The percentage incidence in successive decades from 20 to 70 years was 4, 7, 13, 27, and 36 respectively, and 13 above 70 years. Nearly two-thirds of the cases were in women, and in them the prognosis was relatively more favourable, especially in the cases associated with the menopause. In 20 cases the typical picture of thrombosis of the central retinal vein was present, and in one of these—a woman aged 47 years—sight was restored in six months, and vision was still 4/5 four years later. The low percentage of cases of albuminuria in these statistics is somewhat remarkable, but tends to support the views recently expressed by Dr. P. C. Bardsley[1] that the prognosis in cases which show moderate vascular disease of the retina is not so bad as has generally been thought. As has been shown by Mr. Foster Moore,[2] cases of retinal vascular disease must be classified in various categories, the prognosis varying according to the particular type. It is therefore somewhat misleading to regard hæmorrhagic retinitis as a single clinical entity; it is a symptomatic condition which must be evaluated according to concomitant factors.

SUCCESSFUL OPERATION FOR A BULLET LODGED IN THE WALL OF THE LEFT VENTRICLE.

WE remarked last week that the surgery of the present war had furnished instances of the successful extraction of bullets from the heart substance, while removal from the heart cavity has been reported. At a meeting of the Académie de Medécine de Paris on March 3rd Professor Gaudier, of Lille, described an interesting case in which a bullet lodged in the wall of the left ventricle and had little disturbing influence on the heart's action. The patient was a Russian sergeant, aged 23 years, who was wounded near Monastir on Oct. 1st, 1916. While lying prone on the ground a bullet grazed the left parietal bone and passed through the supra-clavicular fossa. He became unconscious for a time which he could not fix, and was then able to get up. Finding himself alone, he walked until he met some soldiers. He was in a feeble state and walked with difficulty. He could not stand upright and advanced stooping forwards. He felt a severe pain at the apex of the heart, especially when he tried to straighten himself. While being carried to a dressing-station he again became unconscious and passed the night in that condition. He was taken by motor ambulance and train to Salonica. During the journey he regained consciousness, but suffered severely from pain in the region of the heart and could not lie on either side: he rested either on his back or on his abdomen. He was admitted to hospital, where the wound suppurated a little. He became very weak and the cardiac pain was continuous, and was increased by deep inspiration. He was sent to France, where he arrived on Oct. 27th with the parietal wound still suppurating but the supra-clavicular one healed. The pain still continued. About Oct. 15th he was able to get up and go about a little. His general condition was good. While resting the respiration was normal and the pulse 80. After going upstairs there was slight dyspnœa and the pulse varied from 85 to 90; there was no intermission. Auscultation showed nothing abnormal. He was put on ordinary diet and allowed to get about, but as the pain still persisted and there was some dyspnœa after rapid walking he

[1] British Journal of Ophthalmology, April, 1917.
[2] Quarterly Journal of Medicine, January, 1917.

was submitted to radioscopy, which showed that the bullet lay transversely near the apex of the heart and followed all the movements of the left ventricle. It was independent of movements of the diaphragm. Under ether the third and fourth left costal cartilages were exposed and divided, the pleura incised, and the "costal shutter" turned outwards by an assistant. The pericardium was incised vertically for a distance of 5 cm. The heart was seized in the left hand and brought outside the pericardium. In the anterior wall of the left ventricle was a transverse ridge 1½ cm. long above the apex. This was due to the embedded bullet, which was removed. The pericardial incision was closed with catgut and the cartilages sutured. During the operation there was an occasional intermission of the pulse. Recovery was complicated by cough and some fever and some scattered pulmonary râles were heard. The projectile was a leaden Bulgarian bullet, 42 by 7 by 5 mm., with a sheath of "maillechort," flattened at its centre. Similar cases are rare, but one almost identical has been recorded by Duvergen, of Bordeaux.

THE SPECIAL SCHOOL CODE

THE alterations in the regulations of the Board of Education for special schools for blind, deaf, defective, and epileptic children (Special School Regulations, 1917, Cd. 8505, price 3*d.* net, pp. 53) represent for the most part the changes necessary to bring the regulations more into accord with the best existing practice in special schools and also in ordinary public elementary schools. Since 1909, when the last regulations were issued, more extensive provision has been made for open-air education and playground accommodation; the new regulations ensure that special schools shall not fall short of the standard set by the present-day public elementary school. Again, the facilities afforded for the detection of mental and physical defects by the institution of the School Medical Service have resulted in an increase by 50 per cent. of the number of children in attendance at special schools. New types of schools have been provided; not only are partially blind and partially deaf children receiving appropriate instruction, but tuberculous and delicate children are afforded opportunities of attending open-air schools, where not only is the instruction more suited to their particular needs but their return to health is facilitated. In view of the duty placed on local education authorities by the Defective and Epileptic Children Act, 1914, of providing classes or schools for feeble-minded children, a statement of the present requirements of the Board in respect to the arrangements of special schools for mentally defective children is opportune. Among other important features is the provision that blind and deaf children should be examined from time to time by a medical practitioner possessing special ophthalmic or aural experience; in the case of schools provided by local education authorities the Board requires that the medical inspection and examination of the children should be conducted by the school medical officer of the authority or under his immediate supervision. In the case of blind children the Board points out that where suitably qualified blind teachers are on the staff of the school their services would be especially useful in giving touch-developing lessons to all the classes as well as lessons in Braille reading and writing. A further note of progress is sounded by the inclusion of regulations for trade schools for special school ex-scholars. The new regulations indicate that the interests of defective children are not being overlooked during the waging of a world-wide war.

MALARIA IN TRINIDAD.

A REPORT on malaria in Trinidad has been recently issued[1] by Dr. C. F. Lassalle, formerly acting assistant medical officer of health for the colony, but now, we understand, promoted to a higher and more responsible office in the Public Health Service of the island. This report is in three parts, relating to (1) a spleen census made in 1914; (2) an anopheles survey carried out in 1914–15; and (3) a description of the mosquitoes found in Trinidad during an inquiry made in 1915.

The spleen census.—The spleen census of 1914 is the second that has been carried out in Trinidad, the first having been made in the previous year, when out of 17,495 children examined 3134, or 17·91 per cent., had enlarged spleens. In the second spleen census now reported upon by Dr. Lassalle 25,927 children came under examination and 3658, or 14·1 per cent., showed splenic enlargement; in addition, 1576, or 6 per cent., of those examined were suffering from anæmia. The results of the Trinidad spleen census are compared with similar examinations carried out in other countries. In Mauritius, for example, in 1907–8, out of 31,022 children, 10,595, or 34·1 per cent., showed enlarged spleens; and in Ceylon, in 1908, out of 92,258 children submitted to the test, 31,421, or 34 per cent., had splenic enlargement. Compared with these other two island colonies the effects of malaria in Trinidad, as tested by the presence of enlarged spleen among the children, are not specially severe, and Dr. Lassalle predicts that, with enforcement of the appropriate preventive measures now in vogue, the colony will in the future show even smaller effects of malaria than at the present time. A number of statistical tables relating to the various areas in the island are appended to the report.

The anopheles survey.—Anopheles surveys of the districts comprised within the colony were begun on March 15th, 1914, and continued up to April 30th, 1915, when they had to be temporarily suspended. In all of the districts surveyed large and extensive mosquito breeding-grounds were found, as well as others of smaller extent. The work was carried out by sanitary inspectors who had been specially trained in the details of a mosquito survey. That it is possible to rid a town of anopheles has been completely proved in Trinidad. The city of Port of Spain, formerly infested by these insects, may be regarded as free, it being now a very rare occurrence to find an anopheles mosquito. Through the constant efforts of the sanitary department of the town even the formerly ubiquitous stegomyia and culex have almost disappeared. Dr. Lassalle remarks that it may be an impossibility—mainly on account of financial considerations—to eradicate every single mosquito breeding place throughout the colony, but "it is entirely within the range of practical politics" to carry out a scheme of destruction of anopheles breeding grounds within, and for a certain distance around, all towns and villages, plantations, and

[1] Trinidad Malaria Report. By C. F. Lassalle, Acting Assistant Medical Officer of Health. The Government Printing Office, Port of Spain. 1916. Pp. 126.

other centres of population. It is obvious that the reduction of the danger of malaria in a locality must be directly proportional to the reduction of the number of breeding places—the intensity of malaria infestation bearing a direct ratio to the number of mosquitoes regularly hatched out. Dr. Lassalle therefore recommends as a first step in a new campaign against malaria in Trinidad that anti-mosquito regulations applicable throughout the entire colony should be introduced at once.

The mosquitoes of Trinidad.—In his report on the mosquitoes of the colony, Dr. Lassalle says that the collection of eggs, larvæ, adults, &c., obtained in the course of the above-mentioned anopheles survey provided material for the study of the varieties of Trinidad mosquitoes in a more comprehensive manner than would otherwise have been possible. Specimens were sent to the British Museum, the Imperial Bureau of Entomology, and to the Bureau of Æntomology, Washington, for the identification of certain species. A complete list is given of all the Trinidad mosquitoes now known, and a description is also furnished of the most important and best-known species. Dr. Lassalle discusses the association of anopheles larvæ and fish in natural breeding-places. There seems to be some difference of opinion regarding the value of larvivorous fish in keeping down the breeding of anopheles under natural conditions. In concluding his report Dr. Lassalle expresses the opinion that further investigations will doubtless unearth other species of mosquito.

CERTIFYING SURGEONS AND COMPENSATION FOR LOSS OF INCOME.

CORRESPONDENCE has recently passed between the Association of Certifying Surgeons and the Home Secretary on the possibility of compensation being granted to those surgeons who have lost income in consequence of the abolition of investigations into accidents. A loss of £12,000 per annum has been incurred by the medical profession as the outcome of the economical decision of the Home Office to dispense with these investigations, and most of this loss falls upon surgeons who hold important appointments in manufacturing districts, quite a number of them suffering to the extent of between £200 and £300 a year. It was pointed out by the association that surgeons holding the better appointments had given up other work by arrangement with the Home Office, and that many had combined the duties with those of other public appointments, such as medical officer of health, when the loss could not be made good by taking fresh work. The association represented also that when public officials holding appointments on similar terms are dispossessed compensation invariably follows. The Home Secretary, we learn, does not see his way to grant compensation, considering that the terms of employment preclude it, and that the increase of remuneration under certain new duties should be compensatory. But the association has pointed out that the new duties of their members had been of very little monetary advantage to them outside the Pottery districts, the most remunerative work of the kind instanced (that of appointed surgeon under special rules) being open to the whole profession.

Mr. John H. Morgan, C.V.O., has gone to France in the service of the Croix Rouge Français, and is taking command of a large hospital at Nevers.

IRELAND.

(FROM OUR OWN CORRESPONDENTS.)

The Health of Belfast.

AT a meeting of the city council of Belfast, held last week, it was reported that from Feb. 8th to March 17th 96 cases of infectious disease had been notified—viz., 10 cases of typhus, 36 of typhoid, 25 of scarlet fever, 12 of diphtheria, and 13 of erysipelas. During the four weeks ended March 17th last there were actually 12 more deaths than births (751 to 739), 52 of the deaths being due to zymotic disease. 112 deaths were due to pulmonary tuberculosis, 136 to respiratory diseases (exclusive of pneumonia), and 108 to pneumonia. The annual average death-rate from all causes was very high—24·9—while in the corresponding period of 1916 it was 20·2. The unwelcome reappearance of typhus (20 cases in all), the prevalence of typhoid (upwards of 90 cases at present in the Fever Hospital), and the rise in the general death-rate are all disquieting features of the present health of the city.

The Belfast Ophthalmic Hospital.

At the annual meeting of the Belfast Ophthalmic Hospital held on April 6th it was reported that during the year 1916 there had been treated 4206 cases of eye disease and 1704 cases of diseases of the ear and throat; 129 urgent cases were admitted to the wards for morning dressings and 204 patients attended, making a total of 6243 passing through the hospital. During the past two years, owing to five of the surgeons to the hospital being engaged elsewhere in war work, the out-patient department had only been opened on two days a week, yet the number of patients had increased, and Dr. J. W. Browne, the senior member of the staff, single-handed, has carried on all the work. Financially there was a balance of £28.

Hilden Convalescent Hospital, Belfast.

Through the generosity of a well-known member of an old Belfast family—Mrs. Harold Barbour—(who gave £2000 for the equipment of the institution, and has, in addition, undertaken to subscribe £1000 per annum for its maintenance during its existence) another hospital has been founded in Belfast and district for the reception and treatment of wounded soldiers. It is called the Hilden Convalescent Hospital, having been named after the great thread works with which the Barbour family is associated, and is situated in one of the healthiest districts of Belfast, Galwally Park. It has been established by the Ulster Joint Committee of the British Red Cross Society and the Order of St. John, and is the first hospital opened by these organisations in Ulster. A grant of £3000—part proceeds of "Our Day" collection—has been received from the Red Cross. The institution itself, which will be shortly opened, contains 51 beds for patients and an extensive wooden building, in course of erection, as a wing to the main hospital, will accommodate an additional 75 beds. The medical staff so far appointed is as follows, all the officers being honorary:—Medical superintendent, Dr. John Macintosh; visiting surgeon, Dr. James Taylor; visiting physician, Dr. J. R. Davison; consulting physicians, Sir John Byers, Dr. R. W. Leslie, Dr. H. L. M'Kisack, Dr. W. L. Storey, and Dr. W. Calwell; consulting surgeons, Dr. Robert Campbell, Dr. Howard Stevenson, and Dr. S. T. Irwin; anæsthetist, Dr. V. C. L. Fielden; radiographer, Dr. S. Allworthy; surgeon-dentist, Mr. S. A. Deans, L.D.S.

Maternity and Child Welfare.

At the annual meeting of the Belfast Health Society, held in the city hall, Belfast, the Lord Mayor presiding, the total attendance of mothers and infants at the various "babies' clubs" was reported to have nearly reached 8000, while 8145 pints of milk had been distributed, the mothers paying half the cost. An address on child welfare was given by Sir John Byers, who suggested that Belfast should take part in the proposed National Baby Week, to be held from July 1st to 7th.

April 10th.

CENTENARIAN.—Mrs. Elizabeth Elvy has died at Eastling, Faversham, in her 101st year.

Public Health.

REPORTS OF SCHOOL MEDICAL OFFICERS.

In *Berkshire* the number of elementary school children under the county education authority was 22,500 in 1915. The number of children examined as entrants, intermediates, and leavers was 2596. The acting school medical officer, Dr. W. Sisam, states that from May onwards the routine medical inspections had to be suspended, owing to depletion of the medical staff.

Nutrition was found to be satisfactory in 87 per cent., and in only 0·65 per cent. was it actually bad. Cleanliness was satisfactory in 99 per cent.; in no child were pediculi found on the body, and only in six cases were they found in the head. The eyesight was normal in 85 per cent. of the children tested, and in only 5·5 per cent. was it 6/18 or less. Organic heart disease was found in 19 children (0·73 per cent.); in 10 children (0·38 per cent.) pulmonary tuberculosis was diagnosed, and in 79 (3·04 per cent.) it was suspected. Non-pulmonary tuberculosis (glandular, articular, &c.) was found in 10 other children (0·38 per cent.). The only treatment undertaken by the Education Committee was that for ringworm by means of X rays, which was carried out at Reading, Newbury, and Oxford in 47 cases with satisfactory results.

An education area entirely rural in character and occupation is that dealt with in Dr. Frank Robinson's report on schools in *Cambridgeshire* during 1915, the borough of Cambridge not being included. The number of children on the register was 12,406, of whom 3637 were examined according to the routine inspection of age-groups.

Nutrition was satisfactory in 83·7 and "very bad" in 1·3 per cent. In only two children were pediculi found on the body (0·05 per cent.) and in 13 cases (0·35 per cent.) in the head. The vision was normal in each eye in 85 per cent. of the children tested. In 6 children (0·16 per cent.) organic heart disease was diagnosed. Only in 1 child was pulmonary tuberculosis definitely found to be present, but in 19 it was suspected (0·52 per cent.); in 11 others non-pulmonary forms of the disease were found. Ringworm shows a most satisfactory decline compared with former years, only 6 cases having been met with in routine inspection. In one school there were 5 cases in one family (specially inspected), the father persistently refusing treatment, in spite of "repeated visits by the medical staff during the year," until prosecution was threatened. This demonstrates the necessity for prompt action in dealing with culpable ignorance or obstinacy of this kind. The percentage of unvaccinated children, which in 1909 was 6·3, has now risen to 19·1, and in the youngest children newly admitted to school is as high as 43·5, compared with 6·7 per cent. in 1909. The examination of visual defects has been carried out satisfactorily in the outlying districts by Dr. Jessie Gellatly, a portable electrical ophthalmoscopic apparatus, with trial lenses, test-types, &c., adapted for bicycle transport, having been employed, at a total cost of £8 15s.; retinoscopy is done in the school cloak-rooms, the windows being brown papered. Infectious disease was exceptionally heavy in 1915, measles necessitating 87 school closures. Swabbing for diphtheria was extensively practised with good results; positive evidence of infection was obtained in 31 cases.

In presenting his report on schools in *Cheshire* Dr. Meredith Young, the chief school medical officer, alludes to the strain on the administration during the year owing to war conditions. The children examined in the entrant, intermediate, and leaver groups during 1915 numbered 17,890.

Nutrition was below normal in only 7 per cent., and in no case was it actually bad. Cleanliness of the body was also satisfactory in all but 2 per cent., and pediculi were only found in 0·3 per cent.; in 0·6 per cent. they were present in the head. Normal vision in each eye was found in 71·4 per cent. Organic heart disease was diagnosed in 48 children (0·27 per cent.); pulmonary tuberculosis was detected in 17 children (0·09 per cent.) and suspected in 42 others (0·23 per cent.); tuberculosis other than pulmonary was met with only in 34 children (0·19 per cent.). Attention is drawn by Dr. Margaret Ormiston, assistant medical officer for South Cheshire, to a senseless but very common practice in the clothing of children—viz., the excessive number of garments covering the chest and trunk, as many as 11 layers being sometimes met with; while very short frocks and bare knees may lead to chill of the extremities and "growing pains." Children suffering from ringworm of the head are allowed in school if provided with a properly fitted cap until cured. This procedure was found to be quite satisfactory. Thyroid enlargement is reported as being prevalent in the rural districts of Nantwich union and in the Middlewich area, several members of a family being affected in many instances, and transmission being mostly through the maternal relations. This would be an interesting subject for investigation, as goitre, or "Derbyshire neck," has not been hitherto noted in this part of the country.

Owing to depletion of the medical staff on account of the war the work of school medical inspection in the county of *Durham* was limited, during the latter half of 1915, to the examination of ailing and defective children and to re-inspection of children previously found to need treatment. Previous to this, 16,126 entrants and leavers had been examined by Dr. T. Eustace Hill and his assistants.

Nutrition was on the whole satisfactory, being considered bad in only 0·8 per cent.; in an additional 10·5 per cent. it was below normal. Cleanliness was also satisfactory, body vermin being found in only 0·3 per cent. and pediculi capitis in 1·1 per cent. Organic heart disease was detected in 91 children (0·6 per cent.); 57 of these were girls (0·72 per cent.) and 34 boys (0·4 per cent.), showing a marked discrepancy in the sex incidence. Pulmonary tuberculosis was found in only 9 children (0·05 per cent.), but was suspected in 36 other cases (0·2 per cent.); non-pulmonary forms were diagnosed in 0·3 per cent. Energetic measures were taken in regard to the presence of vermin, under Section 12 of the Children Act, and in some bad cases of neglect the parents were sent to prison. Unfortunately, no treatment is undertaken by the county Education Committee, except for defective vision, and owing to the absence of the school oculist on active service comparatively few cases received attention.

Dr. J. Middleton Martin's report on *Gloucestershire* schools deals with the routine inspection of 10,579 children, as well as with 3598 special examinations.

Of the former category, comprising the entrants, leavers, and intermediates, the nutrition was below normal in 16·88 per cent., but in only 0·09 per cent. was it actually bad. Body cleanliness was satisfactory in 94·5 per cent., body vermin were found in only a single instance; on the head they were found in 15 children (0·14 per cent.), all being girls except two. Great improvement has taken place in regard to this condition, the number infected being only about half what was found when examination by the nurse was instituted first in 1908, and a badly infected head being now rarely discovered. In the Tetbury urban district the percentage of infection has been reduced from 39 in 1909 to 7 in 1915. Vision in the right eye was perfect in 86 per cent. and in the left eye in 85 per cent.; the proportion of children having normal vision in each eye is not stated. Organic heart disease was diagnosed in 298 children (2·82 per cent.); 134 of these were among the entrant infants, giving a percentage of 2·91, which seems to be remarkably high. Pulmonary tuberculosis was only found in 3 cases (0·03 per cent.) and suspected in 15 others; in 11 children non-pulmonary forms were found. Treatment for teeth is carried out by the county authority as well as, in certain districts, by voluntary agencies supported by local effort. Infectious diseases were especially prevalent in 1915, and 206 departments had to be closed on this account—nearly double the previous maximum of 118 in 1913. There were, however, fewer cases of infectious skin disease (ringworm, impetigo, and scabies) than in any previous year.

In *Kent* the number of children on the roll of schools under the county education authority was 84,707 and the number examined during 1915 in the code groups was 20,509.

Of these children 94 per cent. were well nourished, and only 0·1 per cent. were in a bad condition in this respect; 92·2 per cent. were clean as regards the body. Defective vision was much more prevalent among girls (13·2 per cent.) than among boys (9·6 per cent.). Heart affection (organic or functional not distinguished) was diagnosed in 2·1 per cent., being somewhat more frequent in girls (2·4 per cent.) than in boys (1·9 per cent.). Tuberculosis of the lungs was found in 0·6 and suspected in an additional 0·3 per cent. and other forms of the disease in 0·1 per cent. As to the age incidence of the specific fevers in children an interesting table shows that 50 per cent. of the boys aged 5 had already had measles. At the age of 9 the percentage was 76·3; at 13 it was 83·9. The analogous percentages for whooping-cough were 34·6, 51, and 51, and for scarlet fever 2·8, 6·4, and 11·2 respectively. For diphtheria the ratios were 1·5, 3·5, and 8·2 per cent. The ratios for girls were for each disease very similar to those of the boys. A table of heights and weights of 2000 boys and 2000 girls shows that in height boys and girls (in Kent) are almost equal at 9 years of age (49·7 and 49·8 inches), and at 13 years (55·6 and 55·8 inches). In weight the girls outgrow the boys in these four years: at 9 years the boys average 56·1 lb. and the girls 54·6 lb; at 13 years the boys have increased to 75·7 lb., but the girls have gone up to 77·4 lb. The relative increase is, however, not so marked as in children in London, where girls of 13 are on an average nearly 3 lb. heavier than boys of that age. The condition of enlarged tonsils and adenoids (not differentiated) was diagnosed in 24·7 per cent. of the boys and 23·4 per cent. of the girls. An abnormally large proportion in a group of cases was found among children habitually taking their dinner at school because of distance from their home or for some private reason; the prevalence among these children was three times as great as among those who go home ..... The connexion of this condition with deafness was shown by the fact that out of 516 cases of defective hearing in 28·2 per cent. enlarged tonsils were present. It is gratifying to hear that care of the teeth is becoming general, the demand for toothbrushes almost exceeding the supply provided by the Education Committee.

Owing to war conditions the routine medical inspection of school children in *Norfolk* during 1915 had to be suspended in April. Matters requiring urgent attention and the management of outbreaks of infectious disease, also the examination of children specially brought forward by the teachers as needing medical care, were dealt with by Dr. J. T. C. Nash, the county medical officer of health, personally during the remainder of the year. His report deals with a total number of 3847 children submitted to the routine examination.

Of these children 86·93 per cent. were well nourished, and in only 0·18 per cent. was the nutrition actually bad. All the children were clean except 1·5 per cent., and in only one child were body vermin found to be present. Organic heart disease was diagnosed in 0·18 per cent., and non-pulmonary tuberculosis in 0·32 per cent. Not a single case of tuberculosis of the lungs was definitely diagnosed, and in only one child was it suspected. Defective vision (less than 6/9 in either one or both eyes) was found in 7·93 per cent. The provision of X ray treatment for ringworm being impracticable, systematic application of mercurial ointment was carried out in a ringworm class of 33 children with such good effect that at the end of the year there were only two children still uncured.

In *Northamptonshire* the work of medical inspection in 1915 was carried out by Miss M. J. Keers, M.B., after the departure of Dr. J. H. Mason on military service in April; 4571 children were systematically examined.

Of these 95·4 per cent. were well nourished, and only one child was considered to be actually in a state of malnutrition; 95·4 per cent. also were clean, and in only three instances were body vermin detected. Organic disease of the heart was present in 0·59 per cent. and pulmonary tuberculosis in 0·46 per cent., other forms of this latter disease being found in 0·24 per cent. Normal vision was present in 67 per cent. of the 1898 children tested. The weights of the boys (73½ lb.) and girls (73¼ lb.) in the urban districts at 12 to 13 years of age were practically equal; in the rural districts the corresponding figures were 74½ lb. for the boys and 77¼ lb. for the girls. In concluding his report Mr. Charles E. Paget, the county medical officer, notes that, owing to the war, a larger number of children than usual have failed to receive treatment, especially in respect to defective vision and throat cases.

In *Warwickshire*, during the early part of 1915, the routine medical inspection of 1979 school children was carried out in addition to special examinations; after June 1st, owing to war conditions, only children specially selected by the teachers and health visitors were examined, to the number of 1112.

A considerable proportion of defects was found in these "special" cases, treatment of which was undertaken with benefit; the interruption of the routine inspection, though making a regrettable hiatus in the progressive improvement of the health of the school children in the county, was probably unavoidable. Verminous heads and ringworm give a good deal of trouble, and treatment of these cases in rural districts is full of difficulty, as the distance from the nearest practicable treatment centre is often considerable. "No scheme for the provision of treatment by the county council of defects found in school children has yet been adopted." Dr. Bostock Hill mentions the difficulties that have been experienced in carrying on the work of medical inspection on account of the war, and is satisfied with the results that have been obtained. Of the 1979 children examined as entrants and leavers nutrition was below normal in 15·2 per cent., being actually bad in only 0·4 per cent.; body cleanliness was unsatisfactory in 4·1 per cent., organic heart disease was detected in 0·9 per cent., and pulmonary tuberculosis in only 0·1 per cent.

The report on school medical inspection in the *West Riding of Yorkshire* in 1915 is very short on account of the absence of nine of the medical staff (including Dr. J. R. Kaye, the school medical officer) on military service. The work has been maintained in spite of difficulties due to this cause. The number of scholars on the school roll was 200,513, of whom 38,023 were examined at the routine inspections, besides 18,971 special cases.

Of the routine cases—entrants, intermediates, and leavers—0·18 per cent. were poorly nourished, and 14·26 per cent. were verminous as regards the head. Pulmonary tuberculosis was diagnosed in 0·23 per cent., and other forms of tuberculosis in 0·38 per cent. Of the whole number of children—entrants, intermediates, and leavers—26·70 per cent. were unvaccinated; of the entrants the proportion was 45·60 per cent. of the leavers 14·69 per cent. These figures speak for themselves. At 17 secondary schools the entrants were inspected; of ages 11 to 14 17·14 per cent. were unvaccinated, and 6·31 per cent. were verminous. It is unfortunate that several of the care committees have ceased to exist, leaving in their respective districts the whole visiting work to be done by the school nurses.

URBAN VITAL STATISTICS.

(Week ended March 31st, 1917.)

English and Welsh Towns.—In the 96 English and Welsh towns, with an aggregate civil population estimated at nearly 18,000,000 persons, the annual rate of mortality was 17·7, against 18·5 and 16·5 per 1000 in the two preceding weeks. In London, with a population exceeding 4,000,000 persons, the death-rate was 17·8, or 0·3 per 1000 above that recorded in the previous week; among the remaining towns the rates ranged from 4·7 in Ealing, 5·4 in Acton, and 8·4 in Oxford, to 24·5 in Bolton, 24·7 in Rochdale, and 25·5 in Plymouth. The principal epidemic diseases caused 406 deaths, which corresponded to an annual rate of 1·2 per 1000, and included 252 from measles, 57 from whooping-cough, 43 from infantile diarrhœa, 41 from diphtheria, 10 from scarlet fever, and 3 from enteric fever. The deaths from measles showed a further increase compared with the numbers recorded in the nine preceding weeks, and caused the highest annual death-rates of 3·3 in Plymouth and in South Shields, 3·9 in Ilford, 4·0 in Walsall, and 7·2 in Dudley. The 795 cases of scarlet fever and the 1377 cases of diphtheria under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital were respectively 22 and 100 below the numbers at the end of the previous week. Of the 5866 deaths from all causes in the 96 towns, 181 resulted from violence. The causes of 54 of the total deaths were uncertified, of which 11 were registered in Birmingham, 8 in Liverpool, and 4 each in London, Manchester, and South Shields.

Scotch Towns.—In the 16 largest Scotch towns, with an aggregate population estimated at nearly 2,500,000 persons, the annual death rate was equal to 17·9, against 18·3 and 16·2 per 1000 in the two preceding weeks. The 418 deaths in Glasgow corresponded to an annual rate of 19·5, or 3·2 per 1000 above that recorded in the previous week, and included 28 from whooping-cough, 16 from measles, 5 from infantile diarrhœa, 3 from diphtheria, 2 from scarlet fever, and 1 from enteric fever. The 116 deaths in Edinburgh were equal to a rate of 18·2 per 1000, and included 7 from whooping-cough, 5 from measles, 2 from infantile diarrhœa, and 1 each from scarlet fever and diphtheria.

Irish Towns.—The 172 deaths registered in Dublin were equal to an annual rate of 22·5, or 3·8 per 1000 below that recorded in the previous week, and included 17 from measles, 7 from infantile diarrhœa, and 1 each from whooping-cough and diphtheria. The 133 deaths in Belfast were equal to a rate of 17·6 per 1000, and included 4 from measles, 2 each from enteric fever and infantile diarrhœa, and 1 from scarlet fever.

THE SERVICES.

ROYAL NAVAL MEDICAL SERVICE.

To be Temporary Surgeon: F. A. Knott.

The following appointments have been notified:—Fleet-Surgeon: A. Woollcombe to *Pembroke*. Temporary Surgeons: R. W. Townley and J. L. Pringle to *Pembroke*.

ROYAL NAVAL VOLUNTEER RESERVE.

J. T. Wood, L.D.S., to be temporary Dental Surgeon.

ARMY MEDICAL SERVICE.

Col. H. A. Bruce, Canadian A.M.C., to be temporary Colonel.

TERRITORIAL FORCE.

To be Deputy Assistant Directors of Medical Services: Major W. E. Miles and Capt. H. Pinto-Leite.

ROYAL ARMY MEDICAL CORPS.

A. J. J. Johnston, Surgeon-General, R.N. (ret.), to be temporary Lieutenant-Colonel.

Temp. Major A. G. P. Gipps to be temporary Lieutenant-Colonel.

Temp. Major E. Webb-Johnson, D.S.O., to be acting Lieutenant-Colonel whilst commanding a General Hospital.

Captains to be temporary Majors: L. J. Rhea, Canadian A.M.C., N. B. Gwyn, Canadian A.M.C., C. Wollard, Canadian A.M.C., and S. R. Harrison, Canadian A.M.C.

To be temporary Majors: Temp. Capts. W. P. Yetts and Wilford V. Robinson (whilst commanding troops on a hospital ship); E. C. Stabb (while employed at the Manor County of London War Hospital).

T. G. Moorhead to be temporary honorary Major.

Temp. Capt. C. G. G. Keane to be Lieutenant and to be granted the rank of temporary Captain.

Temp. Capt. J. D. Gimlette relinquishes the rank of temporary Major on reposting.

The undermentioned are granted temporary honorary rank whilst serving with No. 22 General Hospital:—As Lieutenant-Colonel: H. Cabot. As Major: G. C. Shattuck, E. G. Crabtree. As Captain: E. S. Bridges. As Lieutenant: E. D. Busby, E. S. Welles, F. B. Grinnell, E. S. Fish.

To be temporary Captains: Lieut. T. C. Bowie and C. Robinson. Temp. Lieuts. E. H. Wheeler and F. G. Thomson and F. S. B. Fletcher, S. G. Billington, H. S. Berry, G. B. Flux, B. N. Murphy, M.C., late Captain R.A.M.C.

To be temporary Lieutenants: H. McLean, R. G. Magilone, R. Appleton, S. W. Milner, J. E. Mitchell, J. B. Wilkie, G. McNeill, H. C. Quirke, T. McFetridge, W. L. G. Anderson, H. C. W. Wood, W. G. Attenborough, A. G. Stewart, R. B. Fletcher, J. G. B. Smith, E. A. Price, N. Glegg, W. H. Miller, C. P. A. Stranaghan, P. Murphy, R. J. Croxford, A. E. Baron, E. C. Tamplin, F. Jubb, Temp. Hon. Lieut. T. B. Johnston, A. M. Caverhill, L. N. Morris, C. H. Wagner, T. B. Davies, H. L. Blackley, A. Armer, J. B. McDougall, D. S. Clarke, J. B. Ball, N. S. Lucas, D. Young, A. A. Wilkinson, H. E. Graham, R. A. Campbell, H. Bardsley, A. W. Hare, W. L. M. Day, E. Wragg, G. Nelson, D. W. Anderson.

Officers relinquishing their commissions: Temp. Capts. D. Lawrie and T. J. S. Moffett, Temp. Lieuts. D. C. Wilson, W. J. Greehy, and C. B. Richardson, and Temp. Hon. Lieut. W. H. Thomas (having ceased to be employed with the British Red Cross Society in France).

SPECIAL RESERVE OF OFFICERS.

Lieutenants to be Captains: D. R. Hennessy, J. A. C. Kidd, S. J. V. Furlong, J. Y. McLean, D. Roger.

A. H. Mitchell, from Aberdeen University Contingent, O.T.C., and J. R. John, from London University Contingent, O.T.C., to be Lieutenants.

Capt. W. J. Reid relinquishes his commission.

TERRITORIAL FORCE.

Major E. C. M. Foster to be acting Lieutenant-Colonel whilst commanding a Field Ambulance.

Major W. E. Miles is restored to the establishment on vacating the appointment of Deputy Assistant Director of Medical Services.

Capt. T. S. Allan to be temporary Major whilst in command of a Military Hospital.

Capt. H. Pinto-Leite is seconded while holding the appointment as Deputy Director of Medical Services.

To be Captains: Capt. A. J. W. Stephen (from Northern General Hospital); and Lieuts. J. S. Cooper, J. B. Hogarth, H. England, P. G. Phillips.

Lieutenants to be temporary Captains whilst serving with the Medical Unit of the University of London Contingent, Senior Division, O.T.C.: J. H. Ryffel and W. Wright.

A. G. Harrington to be Lieutenant.

Capts. A. J. Archibald and W. Love relinquish their commissions on account of ill-health. Capt. W. J. Deighan relinquishes his commission on account of ill-health, contracted on active service, and is granted the honorary rank of Captain. Capt. F. W. A. Stott, Attached to Units other than Medical Units, relinquishes his commission on account of ill-health.

VOLUNTEER FORCE.

A. F. Turner (late Lieutenant 2nd V.B. Gloucestershire Regiment), to be temporary Captain and Medical Officer 3rd Battalion Gloucestershire Volunteer Regiment.

INDIAN MEDICAL SERVICE.

Lieut.-Col. H. B. Nelville, on return from leave, has been posted to Gorakhpur as Civil Surgeon. Brevet Col. H. F. Cleveland has been appointed Deputy Director-General, vice Lieut.-Col. F. E. Swinton, and Lieut.-Col. James has been elected a member of the Punjab Medical Council. Capt. R. H. Bott has been elected an ordinary Fellow of the University of the Punjab.

Col. le Bel, the chief doctor of the French-Canadian Hospital at St. Cloud, has been presented with the Cross of the Legion of Honour.

Correspondence.

"Audi alteram partem."

"SOLDIER'S HEART."

To the Editor of THE LANCET.

SIR,—The remarks of Captain Adolphe Abrahams[1] and the comments of Dr. Thomas Lewis have much interested me, and perhaps I may be pardoned for again trespassing upon your space.

The opinion of both Captain Abrahams and of Dr. Lewis upon cardiac strain seems to me to be particularly valuable. Although I cannot lay claim to the athletic distinction of Captain Abrahams, yet I have been capable of prolonged and strenuous exertion, and having been at the same time interested in morbid affections of the heart, naturally I have paid some attention to the effect of exercise upon the heart. As an illustration of the fact that I have at times put my own heart to more or less severe tests, it may be mentioned that although I have long passed the age of youth, in the month of April preceding the outbreak of war I rode on an ordinary "push-bicycle" from Taz-malt in Algeria to Algiers, a distance of 179 kilometres (112 miles) in nine and a half hours, although my low gear was out of order and could not be used. All the hills were ridden, some of them no mean ones, and the ride ended over a road paved for six or seven miles with cobble-stones. The ride also happened to have been during an unusually hot spell of weather for the month of April. I was told that the thermometer on the day of my ride had registered 98° F. in the shade in Algiers at one hotel.

While it has not fallen to my lot to meet with opportunities upon which to base an opinion regarding the question of cardiac strain such as have fallen to Sir Clifford Allbutt and to Captain Abrahams, it has always appeared to me that an "athletic heart," if it occurs at all, must be so rare as to require to be classed under the heading of medical curiosities rather than of pathological conditions worthy of serious attention. Yet during an experience in the post-mortem room covering about 2500 necropsies I met with three instances of great enlargement of the heart which, by excluding all other possible causes of enlargement, appeared with some reason to have been consequent upon prolonged physical exertion. But two of those cases occurred in stokers in gasworks, and the third in a blacksmith. It is obvious that in those cases strenuous work was carried on under unusual conditions—namely, under the influence of great heat—and the question arises whether the heat may not have been the more important factor in leading to the cardiac enlargement. During heavy work in a hot atmosphere most of the water drunk must be passed off by the skin, comparatively little by the kidneys. Toxic products of metabolism may be retained and the heart suffer in consequence. A good example of toxic enlargement of the heart, it may be mentioned in passing, is the enlargement which is not so very uncommonly met with as a result of excessive indulgence in alcohol, but alcohol as a cause for enlargement in the above cases was as far as possible excluded.

However reasonable or unreasonable my theory may be regarding a toxic causation for enlargement of the heart occurring in association with prolonged arduous work, it is a sufficient supply of fluid that I require to enable me to arrive at the end of a long ride feeling capable of doing as much again. Captain Abrahams attributes the warding off of fatigue during one of his physical feats to a good meal. It seems to me that if the circulation benefits from the solid constituents of a meal taken during exercise it can only do so because the food acts as a mechanical stimulus to the abdominal vaso-motor system, a stimulus which, of necessity, reacts on the general circulation. The muscles can derive no direct benefit from the meal until time has allowed digestion to take place, whereas the influence of a meal on the sense of well-being is almost immediate. Some persons may require abdominal stimulation of the vaso-motor system during strenuous exercise, in others fluid taken in sufficient quantity to make up for the loss of water by perspiration may be all that is necessary. It is true that in the above-mentioned ride I drank two bottles of sweet lemonade and two large cups of café-au-lait containing sugar, and thus took a rapidly diffusible food in the form of sugar; but on several occasions during a ride of nearly 1300 miles in Algeria and Tunisia, including a ride from Algiers to Tunis, I frequently had water only in the course of the day, which fortunately could often be procured clear and fresh in the mountainous and hilly districts.

In addition to physical conditions affecting the circulation, as Captain Abrahams points out, the mind also has its influence. A child may run about all day after butterflies and show no sign of fatigue, but become hopelessly tired after an hour's dull walk. The athlete may have an object in view and feel no fatigue until the object is attained. This is not the case with the soldier. Most of his exercise is undertaken with no other stimulus than that of fulfilling, it may be, dull duty. He is at a disadvantage in another way. The athlete's feats are more often than not spasmodic. Consciously or subconsciously, should he overstrain in some measure his physical powers he, by a diminution in outlet of energy, allows time for recuperation. The soldier is not his own master in such matters, and in the absence of sufficient time for recuperation the nervous balance of the vaso-motor system may be upset.

The athlete will, I think, if he study his own circulation for a day or two after some feat in which he had put a strain upon his physical powers, great even for himself, find some departure of the vaso-motor system from its usual smooth working. This is most likely to take place when strenuous exercise has not previously been undertaken for some time, but it seems to me that slight temporary disturbance of the vaso-motor system may undoubtedly occur. The conditions of life of the athlete are such that he suffers no harm. The conditions of the soldier may be otherwise.

I am, Sir, yours faithfully,

April 2nd, 1917. THEODORE FISHER.

[1] THE LANCET, March 24th, 1917, p. 442.

To the Editor of THE LANCET.

SIR,—With Captain Adolphe Abrahams's conception of the "soldier's heart,"[1] with his observation of the aggravation of that condition which frequently appears to result from much attention being called to it in cordaria or in general hospitals, and with his experience of the natural disinclination manifested by some who have suffered from it again to "face the music" of outrageous war my own views and experience largely agree. The "defensive neurosis" of which he writes is certainly shown by some, although not by all. Others are bravely anxious to resume duty and do so, and I have found this even among "gunners," whose "job," to use a Service term, is more arduous than that of some other branches.

The psychical and neural factors, as I have before argued, play a large part in some cases of *persistent* soldier's heart, but a tedious or protracted form of this condition is met with also in the unemotional and stable man who is physically played out and whose nervous system doubtless manifests changes not otherwise expressible at present than by such terms as the loss of reserve force or exhaustion. The prospects of even a young and healthy man, who has escaped invalidism and injury and been actively engaged in modern warfare for 18 months or 2 years and who shows the "soldier's heart" (the advent of which, in some cases, is precipitated by a "shell shock"), of again being able to resume full duty are not good. Who can say that such a one has not earned relief from work in the fighting line, although there is no release in war? He has "done his bit" and may find useful war work elsewhere than on the stricken field.

It is, however, to another point in the heart of the soldier, as distinguished from the "soldier's heart," that I wish now briefly to allude, conceiving the point to be of practical importance. Captain Abrahams's remarks, if I may without offence say so, have, on the whole, a commendable reserve and balance, but I would respectfully suggest that as an adherent of the new cardiology—the modern aspect of heart disease, to use the phrase of the last Lumleian lecturer—he has revived, in his contempt for the cardiac bruit, a view which, I had hoped, was fast finding a richly deserved quietus. The "purrs," "barks," "roars," and "squeaks" of the heart are not

[1] THE LANCET, March 24th, p. 442.

precisely analogous to the various grunts of an efficient motor-car. In making this comparison Captain Abrahams doubtless is, however, rhetorical rather than instituting that analogy which has been well called the fruitful mother of many errors.

Many systolic bruits, transient or extracardial in nature, which are usually easily diagnosed and have frequently been fully appreciated, are, of course, negligible. But with all due regard for the value of integrity in muscular power (the importance of which, so far as I know, has for long been recognised even by those who find some wisdom in *old* aspects of heart disease) is it contended, may I inquire, that it is an excellence in the cardiac mechanism to possess a defective valvular apparatus? The new cardiologist, who regards with some complacency his additional enlightenment, would appear at times to think so. Is the career of a soldier one to be chosen by those who possess even a mitral lesion which has survived with impunity the calls of civil life and shows when examined no material enlargement or dilatation of the organ? Experience answers, Certainly not. Organic valvular disease, direct and reflux, which has been overlooked or ignored, and notwithstanding exceptions to the rule, has frequently been found to lead to hopeless invalidism, and at times even to the death of the soldier. So well established is this fact that no medical officer, however "modern" his outlook on heart disease, would be justified in subjecting the bearer of such a lesion to the exertions and vicissitudes of the soldier's life in war. It is to emphasise again this point, on which a considerable experience enables me to speak with conviction, that I write these lines. Fortunately, the Army Medical Service as a whole, and in spite of "modern" conceptions, continues to prefer an entire to a broken pump in the circulation, even when the break is only in the wash-leather.

I am, Sir, yours faithfully,

ALEXANDER MORISON.

Upper Berkeley-street, W., April 2nd, 1917.

THE LUMLEIAN LECTURES ON HEART DISEASE.

To the Editor of THE LANCET.

SIR,—There is one point in the modern study of heart disease which, I think, hardly meets with the recognition that it deserves, and I venture to believe that in the future it will greatly alter the attitude of the medical profession to this study. It is this: that we can from the most frequent cause of heart disease in this country not only isolate the exciting cause, but reproduce the lesions, and thus the rheumatic heart is proved to be an infective process. From the date of this acquisition to our knowledge I hold that much teaching on the subject of heart disease has been entirely altered. So far as cardiac infections are concerned, we see at once that there are two phases—running of course, the one into the other—the active phase, in which everything ever to be gained in the way of cure must be sought for, and the stage of scar formation, in which palliative measures are only possible. Further, we realise that the study of heart disease is not, as would so often appear to be thought, a study of the heart alone, but a study of the response of the heart to infection, correlated with the responses of the other viscera.

It is often enough that the character of the infection, *quâ* virulence, determines the future of the patient rather than the particular physical signs at the moment. To estimate this virulence we must study not the heart alone but the patient. The life-history of the infection is of more cardiac importance than irregularities of action or valvular lesions. Why does the infection, in some cases, linger stubbornly on, breaking out at intervals, and producing in this way stenosis? Why do the valvular lesions sometimes fail to heal and thus produce various grades of malignancy? Again, why does the rheumatic infection in some cases damage the nervous mechanism of the heart, as in children it does the brain in chorea, thus producing intractable cardiac "neurasthenia"? How much can we influence the development and course of heart disease by more careful attention to angina faucium? What can we do to prevent scar formation by alteration of surroundings and more prolonged convalescence? When are we going to look upon scar formation as a failure in our methods and not as "heart disease"? These are problems with which what I venture to call the modern study of heart disease confronts us; these are the problems the solution of which, however imperfect, will lead to the relief of the human race from much affliction. Our text-books mostly begin at the end of the story, or perhaps it would be more correct to state that they lavish most of their wisdom on a lost cause. There are admittedly very many points in heart disease unassociated with infection, and I have nothing but admiration for the investigations connected with them, but I do claim that the establishment of cardiac infection in rheumatic heart disease is not only modern, but will eventually alter entirely the methods of description of many of the most important developments of heart disease.

I am, Sir, yours faithfully,

Devonshire-place, W., April 6th, 1917. F. JOHN POYNTON.

THE EXAMINATION OF THE BLOOD OF TYPHUS FEVER CASES BY DARK-GROUND ILLUMINATION.

To the Editor of THE LANCET.

SIR,—The infective agent in typhus fever has been a subject of much investigation in recent years. In Belfast we have made numerous blood cultures, but have failed to isolate any micro-organism which could be definitely incriminated as the cause of the disease. During the past few weeks we have had an opportunity (through the courtesy of Dr. Gardner Robb) of examining the blood of typhus fever patients with dark-ground illumination. Our investigations are yet far from complete, but the following facts seem worthy of putting on record.

1. In all cases examined before the crisis the blood shows a well-defined slender body which is about the thickness of the *B. typhosus* and, like the latter, is of variable length. This body is extremely pliable, wriggles, and shows distinct motility. In some cases its length is about 4μ, in others 6–8μ, and often a long slender filament about 16μ is seen. The clean-cut outline and the motility and the characteristic appearance indicate its parasitic character and differentiate it from any artefact. Whether it should be classed as a bacillus or spirochæte must be decided by further study. The appearance in the dark field is such as is presented by ordinary bacilli, but the longer forms are not unlike the straighter forms of the *Spirochæta ictero-hæmorrhagica*. Against the view that it is a bacillus is the fact that our cultures so far have been completely negative. It is remarkable that blood which contains numerous living forms of above description inoculated on all kinds of media both under aerobic and anaerobic conditions shows no growth. The micro-organism at each pole shows a highly refractile granule, and its slender pliant body differentiates it from the diphtheroid bacilli described by Plotz and others.

2. The micro-organism is free in the plasma. If the citrated plasma is centrifrugalised and the deposit examined in the dark field the presence of the germ is readily detected, but as a rule there is no difficulty in finding it without this procedure. Since the disease is transmitted by lice it is obvious that the virus must be present even in a small drop of blood.

3. The presence of above germs in blood which gives no growth on ordinary media is diagnostic of typhus fever.

4. So far we have examined blood from 12 separate cases of very different ages and in all have found the micro-organism. The day of the disease at which blood was examined varied from the fifth to fifteenth. During convalescence the germ could not be detected in several specimens, though it had been found at the acute stage.

In conclusion, we may state that a very careful examination of five specimens of normal blood showed no bodies at all resembling the above. We used Leitz's dark-ground condenser, 1/6 objective lens and 4 ocular, and as a source of illumination Mill's electric arc lamp. We need hardly add that slides, coverslips, &c., were scrupulously clean and sterile. In our opinion the micro-organism is closely related to the *Spirochæta ictero-hæmorrhagica* and to the bacillus found by Wolbach in Rocky Mountain fever, and pending further investigation might be described as the *Spirochæta typhi*.—We are, Sir, yours faithfully,

W. JAMES WILSON,
GEORGINA R. DARLING.

Hygiene and Public Health Laboratories, Queen's University, Belfast, April 6th, 1917.

THE CLOSURE OF COLOTOMY OPENINGS.

To the Editor of THE LANCET.

SIR,—In his letter in your issue of April 7th Mr. Lockhart-Mummery still maintains that the enterotome method of closing a colotomy opening is the best. He objects to the method of Greig Smith on the ground that—

"The extraperitoneal operation is very liable to leave a weak place in the abdominal wall, and many patients have subsequently to wear belts. It also leaves a condition which is not normal and is liable to cause trouble later."

In his paper in your issue of March 10th, in discussing the enterotome method, he states:

"The only objection to it is that the condition left is not quite normal, as the bowel remains attached to the abdominal wall, and there is often a weak spot which may necessitate the wearing of a belt or support."

Wherein lies the difference?

I have seen no trouble subsequent to the extraperitoneal operation. Mr. Lockhart-Mummery condemns the extraperitoneal method as being dead, but in doing so condemns his enterotome method. He wrote his paper feeling that as surgeon to St. Mark's Hospital he should call the attention of the uninitiated to the best method of closing colotomy openings. The enterotome method he regards as "the easier and by far the safer" when compared with the resection method. He must admit the same for the extraperitoneal method, as from his own statements he has no more objection to it than he has to the enterotome method.

His paper was also written to describe "(1) the easiest and (2) the best methods of closing a colotomy." A third object might have been the safest method. The statistics given by him show by his methods 14 per cent. deaths and 16 6 per cent. failures after repeated operations. The figures I gave in my letter of March 31st show for the extraperitoneal method 2 6 deaths and no failures. I think that even Mr. Lockhart-Mummery should agree that the extraperitoneal method is the one to be adopted by the less initiated, the resection method being kept for the unusual case and the enterotome put into the museum.

A point which has not apparently been made clear is, that there must be adequate clearing of the bowel before the opening is closed. If this is done, what can be the object of having the bowels opened on the second day? It will cause undue tension on the sutures. There are no masses of hard fæces in the bowel. Even if there were hard masses of fæces present due to faulty preparation, then a small enema or small doses of salts will not break them up. The stimulus will only cause them to come into the neighbourhood of the sutures, a condition of things which, I agree with Mr. Lockhart-Mummery, is to be avoided at all costs. In my opinion, routine opening of the bowel on the second day will cause failure in the closing of colotomy openings.

I am, Sir, yours faithfully,

ERNEST FINCH, M.D., M.S. Lond., F.R.C.S. Eng.,
April 9th, 1917. Assistant Surgeon, Royal Infirmary, Sheffield.

TUBERCULOSIS AND THE WAR.

To the Editor of THE LANCET.

SIR,—In reply to Dr. Edward E. Prest's letter in THE LANCET of March 24th, as a believer that a good deal of the trouble in the comparison of tuberculous cases is due to the inexact use of terms, I should be glad to know what he means by "that he may be permanently cured," and how the condition is recognised when it is attained, as after much inquiry I have up to date failed to find a satisfactory description of how it may be achieved and recognised.

In connexion with his desire to give five months' treatment in a sanatorium to cases classified as Class I., I may state that I have had two cases sent to my sanatorium this week from the Army which illustrate the point. One patient came from India; there was T.B. bacillus found in the sputum months ago, when his condition of health was very low. He is now his normal weight, he has no temperature variation (taken rectally), no increase of pulse-rate, no cough, no sputum; desires and is quite capable of working after a short holiday. Should I send him to "a properly conducted sanatorium"? The other case was discharged from my sanatorium 20 months ago, apparently all active symptoms having subsided and in excellent health. He has now been returned from France after 12 months' service, 1 stone heavier than when he left, with no cough, no sputum, no increase in pulse-rate, and no variation of temperature He is much amused at his success in getting his discharge and pension. He is a very efficient "swinger of the lead," as I know from experience, and he will remain in the sanatorium as long as we are willing to keep him, and would thoroughly enjoy "five months' treatment."

I fully believe in sending Class I. cases into a sanatorium if they show any loss of resistance during dispensary attendance; in fact, very few others are admitted here except soldiers' dependents or cases forwarded by the War Office; but from watching a considerable number of cases (about 2000) I am satisfied that there is a stage anterior to that requiring the complete cessation of wage-earning, which the sanatorium treatment necessitates. Any threat to their resistance by the tubercle organism can be countered without turning them into invalids, even temporarily. This stage takes a certain amount of care in recognising, and is generally classified as incipient phthisis. When a sanatorium is indicated the lesion has usually become more definite, and permanent tissue destruction has occurred, as is demonstrated by the physical signs of the grosser nature easily recognised by the ordinary stethoscope.

More than 50 per cent. of the cases that have been passed through the sanatorium here in the last two years are in full work, many for a considerable time, without deterioration. Still, I should hesitate to describe them "as permanently cured," and it is considered advisable that they should still attend the dispensary occasionally for observation and advice.

I am, Sir, yours faithfully,

Middlesbrough, April 4th, 1917. HENRY A. ELLIS.

READING BY EAR.

To the Editor of THE LANCET.

SIR,—Will you permit me to point out that the article in the *Times* of March 29th describing a recent trial of the optophone was of a somewhat misleading character. On Jan. 25th Dr. d'Albe undertook to give a demonstration of the practical value of the optophone before some experts of the National Institute for the Blind, this demonstration to consist of the reading of newspaper type at the rate of 25 words a minute. It was deferred until Dr. d'Albe had practised to a degree which he considered sufficient on the instrument to be employed. Dr. d'Albe selected March 26th as the date, and I have it from him that he had practised 130 hours on the optophone used.

As to how far short he fell of his expectations the following extract from a report submitted to me by the four experts of the National Institute for the Blind who attended the demonstration, and two of whom were blind men, will show.

The speed which the inventor was able to attain—one word in one minute and a quarter—would be utterly useless. Dr. d'Albe's contention that increased speed was purely a question of practice is not convincing, for our knowledge of the optophone leads us to believe that the speed must always be so slow and the use of the instrument so nerve-racking as to make the optophone of little or no value to blind people, whatever may be its use in other directions. But even assuming that a satisfactory speed could be obtained, the expensive character of the instrument would put it out of the reach of the average blind person.

I hope that Dr. d'Albe will now cease to issue misleading statements with regard to the practical value of the optophone as a means of enabling blind people to read. It can at present be only described as an interesting scientific toy. It is to be most sincerely hoped that Dr. d'Albe will in the course of time succeed in producing results from his ingenious invention which will render it worthy of serious consideration by those who have the interests of the blind at heart.

I am, Sir, yours faithfully,

ARTHUR PEARSON,
President, National Institute for the Blind.
Great Portland-street, London, W., April 2nd, 1917.

*** We noted on Feb. 17th Dr. d'Albe's demonstration of the optophone at the Röntgen Ray Society and his claim that with practice printed type could be read at the rate of several words a minute. This claim he appears to have failed to establish.—ED. L.

The War.

THE CASUALTY LIST.

THE following names of medical officers appear among the casualties announced since our last issue :—

Wounded.

Major J. S. Jenkins, Canadian A.M.C.
Capt. A. Peden, R.A.M.C.
Capt. P. R. Bolus, R.A.M.C.
Capt. J. G. Greenfield, R.A.M.C., attached Cameronians.
Capt. G. F. Hardy, M.C., R.A.M.C., attached Royal Garrison Artillery.
Capt. J. Hardie, Australian A.M.C.
Capt. F. R. Sturridge, R.A.M.C., attached Royal Sussex Regiment.
Capt. J. A. R. Wells, R.A.M.C., attached Lancashire Fusiliers.
Capt. V. E. Badcock, R.A.M.C., attached Highland Light Infantry.
Capt. C. H. Fischel, R.A.M.C., attached Royal Field Artillery.
Capt. R. P. Rosser, R.A.M.C.
Capt. A. A. Rutherford, R.A.M.C.

Missing.

Capt. S. J. Linzell, R.A.M.C.

DEATHS AMONG THE SONS OF MEDICAL MEN.

The following sons of medical men must be added to our lists of those who have fallen during the war :—

Second Lieut. R. B. W. Gosse, Cheshire Regiment, attached Royal Warwick Regiment, second son of Dr. H. W. Gosse, of Eccleshall, Staffs.
Lieut. F. C. Woods, Royal West Surrey Regiment, younger son of the late Surgeon-Major Woods, A.M.S.

MENTIONED FOR WAR SERVICES.

The name of the following medical officers are to be added to the list given in THE LANCET of March 3rd, p. 353 :—

Temp. Col. J. Atkins, C.M.G., A.M.S.; Temp. Capt. W. T. Finlayson, R.A.M.C.; Surg. Lt.-Col. and Hon. Surg.-Col. D. Hepburn, R.A.M.C.; Major (temp. Lt.-Col.) G. S. Mansfield, Reserve of Officers, R.A.M.C.; Temp. Capt. C. R. Stewart, R.A.M.C.; Temp. Major R. H. Swan, R.A.M.C.; Major and Bt.-Lt.-Col. C. R. Sylvester-Bradley, R.A.M.C.; Temp. Capt. D. J. Thomas, R.A.M.C.; Lt.-Col. F. H. Westmacott, R.A.M.C.

The following corrections in the list given in THE LANCET of March 3rd are announced :—

For Lt.-Col. J. Battersby read Lt.-Col. H. L. Battersby; for Maj. E. Grey read Maj. E. Gray; for Maj. J. H. H. Pirie read Maj. W. R. Pirie; for Davies, Temp. Capt. F. J. P., read Daly, Temp. Capt. F. J. P.

THE CENTRAL MEDICAL WAR COMMITTEE: THE SUPPLY OF MEDICAL OFFICERS FOR THE ARMY.

At a meeting of the Central Medical War Committee, held on Wednesday, April 11th, a report by the Assessment Subcommittee was read, showing how it was proposed to meet the demands of the War Office for further medical officers.

The report stated the position was as follows—that of the number of medical officers required by the War Office by May 31st, some 250 men were still wanting, and that, as the first step towards making up this deficit, it had been decided to include in a further call men between 41 and 45, men passed for home service only, and men who, having served with the Army, have returned to civil practice for not less than one year, this being in addition to any men under 41 who could still be spared from the districts in which they practised.

The Assessment Subcommittee proceeded by dividing all the material possibly available into three groups—namely, areas which cannot under existing circumstances supply more medical men; areas in which it is not possible to say that this disability definitely exists; and, lastly, areas on which a call can be made immediately. Under this third group were included those areas and sub-areas in which more medical men are now available by an increase in their number since the last call was made, or by the raising of the age-limit. Having made careful analysis of the sources of supply in minute detail, the Assessment Subcommittee, in the report, considered that the new call which it proposed would make good the estimated deficit in the number of medical officers demanded by the War Office by May 31st.

The report of the Subcommittee, after debate, was approved in a resolution of the following terms :—

1. That the Committee approves the report of the Assessment Subcommittee as to the prospects of meeting the requirements of the War Office for May 31st, and authorises calls to be made forthwith in accordance therewith. 2. That on the facts ascertained from the critical review now made of the remaining provision for the civil community the Committee records its opinion that no further substantial reduction in the number of doctors in civil practice can be effected without such public dissatisfaction as, in the opinion of the Committee, should not be occasioned on its sole responsibility; it therefore deems it its duty to place the position before the Government through the departments with which it is chiefly brought into relation—namely, the War Office, the Local Government Board, and the Insurance Commission.

At a recent meeting of the Executive Committee of the Wandsworth Division of the British Medical Association, a resolution was unanimously carried protesting against any measure of compulsion being applied to the medical profession which is not at the same time applicable to the whole community.

THE MEDICAL SERVICE OF THE UNITED STATES NAVY.

America's momentous decision to take a part in the war gives special interest to an illustrated article dealing with the United States Naval Medical Service which appeared in the *New York Medical Journal* of March 17th. Before the passing of the Act of August 29th, 1916, which provided for a large increase in the personnel, the Medical Corps of the United States Navy consisted of 345 medical officers. The full complement is now 683 and there are stated to be about 300 vacancies. The limits of age for appointment are 21 to 32 years, and, as in our own naval service, candidates have to pass both a physical and a professional examination. No candidate is accepted unless his physical condition warrants an expectation of active service until the retiring age of 64 years, when he receives two-thirds of the pay of his grade. The professional examination is divided into two parts, the first being for enrolment in the Naval Reserve Force. If successful the candidate attends a course of instruction at the Naval Medical School on full pay and allowances, upon the completion of which he takes the final examination for appointment in the Medical Corps of the Navy. The pay of an assistant surgeon on shore duty is $2000 per annum with quarters, or, when quarters are not supplied by the Government, an additional allowance for quarters amounting to $432. At sea the assistant surgeon receives $2200, his quarters and attendance being furnished him aboard his ship. Every five years the pay of an officer increases by 10 per cent., although the increment cannot exceed 40 per cent., calculated on the annual base pay of his grade. The pay of a medical director with the rank of captain is thus limited to $5000, that of a medical inspector with the rank of commander to $4500, and that of surgeon with the rank of lieutenant commander to $4000. The pay of a medical director with the rank of a rear-admiral is $6000 for the lower half and $8000 for the upper half of those in that grade.

In addition to the regular Naval Corps there is a medical division of the Naval Reserve Force which requires 500 surgeons, membership being open to all medical men under 44 years of age who are American citizens. A member receives two months' retaining pay for every year of his enrolment, in addition to service pay for any term of actual service which he may give, the pay corresponding to that for similar ranks in the Navy. Members who re-enrol for four years, subject to certain conditions, receive an increase of 25 per cent. of their base retaining pay. After 20 years' service an officer may be retired on his own application, with a cash credit equal in amount to his retaining pay during the last term of enrolment. In order to meet the need for rapidly training reserve officers in the duties of medical recruiting during mobilisation a correspondence course has been established at the Naval Medical School, Washington, D.C.

MEDICAL ARRANGEMENTS IN VOLUNTEER BATTALIONS.—A question addressed to the Under Secretary of State for War last week in the House of Commons elicited the fact that the appointment of medical officers to volunteer battalions has been sanctioned by the War Office. It has not yet proved possible to proceed with the formation

of volunteer field ambulances, owing to changes of organisation consequent on the passage of the Volunteer Act. Proposals were, however, under consideration, and Mr. Macpherson hoped that the matter would shortly be settled.

THE ARMY DOCTOR'S RISKS.—In the House of Lords last week, when the Military Service (Review of Exceptions) Bill was read a third time and passed, Lord Derby said it was impossible to set up medical appeal boards all over the country, as was asked for in the House of Commons, because there were not sufficient doctors to do the work. Some people, he said, thought that the work of the Royal Army Medical Corps was free from danger, but, as a matter of fact, the Army lost more than 400 doctors killed and wounded in the Somme battle alone. At the present moment, he added, the Army was not critically, but certainly lamentably, short of doctors.

Medical News.

EXAMINING BOARD IN ENGLAND BY THE ROYAL COLLEGES OF PHYSICIANS OF LONDON AND SURGEONS OF ENGLAND.—At the Second Professional Examination of the Conjoint Board in Anatomy and Physiology, held on March 28th and 29th and April 2nd, 52 candidates presented themselves, of whom 30 were approved and 22 were rejected. The following are the names of the successful candidates:—

Hussein Amin, Cairo and Guy's Hospital; Henry Edwards Archer, St. Bartholomew's Hospital; Arthur Beadblock, University College; Benjamin Faltas Behman, Assiut and King's College; Anna Bridget Broman, London School of Medicine for Women; Harold Mallows Brown, Guy's Hospital; Marjorie Carnsew Chappel, London School of Medicine for Women; Alice Maud Mary Clegg, Liverpool University; Saul Cohen, Guy's Hospital; Redgewell George Dansie, King's College; Thomas Draper, Edinburgh; Henry Dryerre, Royal Colleges, Edinburgh; Abdel Hamid El Rakshi, Cairo and King's College; Edwin Spencer Etheridge, University College; Gerald Hartas FitzGerald, Guy's Hospital; Herman Meyer Gerson, London Hospital; Wahba Girgis, St. Mary's Hospital; Harry Cunliffe Hopkinson, Cambridge and Manchester Universities and Middlesex Hospital; Aga Mohamed Kazim, Bombay University and Madras Medical College; Henry David Kelf, St. Bartholomew's Hospital; Frederick Charles Lewis, Liverpool University; Edgar Duncan Macmillan, St. Bartholomew's Hospital; Syed Francis Mahmood, Cardiff and St. Bartholomew's Hospital; Anna Miller, London School of Medicine for Women; George Geoffrey Newman, London Hospital; Arthur Samuel Pearson, Birmingham University; Guy Kingham Reeves, Guy's Hospital; Benn Roland Reynolds, University College, Cardiff; and Gerald Maurice Joseph Slot and William Gilbert Desmond Harold Urwick, St. Bartholomew's Hospital.

UNIVERSITY OF LONDON.—At examinations for internal and external students held recently the following candidates were successful:—

SECOND EXAMINATION FOR MEDICAL DEGREES, PART I.

Dulcie Stapleton Adkins and Doris Elizabeth Alcock, London School of Medicine for Women; Christopher Howard Andrewes, St. Bartholomew's Hospital; Marjorie Henrietta S. Auden, Frances Sophia Barry, and Geraldine Mary Barry, London School of Medicine for Women; Davis Evan Bedford, Middlesex Hospital; Percy Croad Brett, St. Mary's Hospital; John Laird McKenzie Brown, St. Bartholomew's Hospital; Margaret Minna Brownstone, London, School of Medicine for Women; *Maurice Danks Cadman, St. Thomas's Hospital; Frederick Cecil Wray Capps, St. Bartholomew's Hospital; Joan Katherine Somerville Cave, London School of Medicine for Women; George William Cheater, King's College; Anaple Frances Mary Christie, London School of Medicine for Women; John Joseph Coghlan, London Hospital; Joseph Alfred Cohen, King's College; Julius Cohen, St. Mary's Hospital; Henry Nathan Warner Collins, King's College; Nancy Macnaughton Coutts, Elsie Eleanor Cowperthwaite, and Barbara Cubitt, London School of Medicine for Women; Godfried Leon Jozef A. De Rynck, University College; Edith Monica Down, London School of Medicine for Women; Nicholas Bernard Dreyer, Guy's Hospital; Archibald Glen Duncan, London Hospital; Edith Marian Evans and Ada Marion Freeman, London School of Medicine for Women; Arthur John Gardham, University College; Janet Katharine Gatty and Madeline Giles, London School of Medicine for Women; Humphrey Hart Gleave, University of Leeds; Kate Glyn-Jones, London School of Medicine for Women; Brian Wilson Barnett Gordon, St. Mary's Hospital; Eleanor Graham, London School of Medicine for Women; Nellie Gray, King's College; Katharine May Harbord and Gertrude Eleanor Harre, London School of Medicine for Women; Martin Curgenven Hartley, London Hospital; Majorie Christina Hawkins, University College, Cardiff; Hilda May Haythornthwaite and Phyllis Mary Horton, London School of Medicine for Women; Margaret Olwen Howell, University College, Cardiff; Margery Kathleen Illingworth and Doris Eleanor Parker Jolly, London School of Medicine for Women; David John Jones and Dilys Menai Jones, University College, Cardiff; Dorothy Maud Kemp and Kathleen Helena Beatrice King, London School of Medicine for Women; William Edward Kappel Kirby, University College; *Joseph Victor Landau, St. Bartholomew's Hospital; Geraldine Zarita Lee Le Bas, Bedford College; Margaret Longbottom, London School of Medicine for Women; Rupert Alexander Madgwick, London Hospital; Montague Maizels, University College; Iva Clare Marion Molony and Eva Joyce Newton, London School of Medicine for Women; Bertram Sydney Nissé, London Hospital; Sybil Mary Nuttall, Helen O'Brien, and Alice Owen, London School of Medicine for Women; Charles Frederic Parry, Rupert John Parry, and Thomas Parry, University College, Cardiff; Louise Olivia Paterson and Winifred Peacey, London School of Medicine for Women; Norman August Marais, London Hospital; Phœbe Myfanwy Phillips, Evelyn Violet Pilley, Tresaila Laura Pires, Alice Dorothy Pocock, and Cassie Ethel Pratt, London School of Medicine for Women; Charles Arnold Probert, private study; Louise Agnes Proctor and Hilda Winifred Richards, London School of Medicine for Women; Philip Lawrence Richardson, Guy's Hospital; Isabella McDougall Robertson, London School of Medicine for Women; William George Rose, St. Mary's Hospital; May Kathleen Ruddy and Maud Sanderson, London School of Medicine for Women; John St. Clair Shadwell, Guy's Hospital; Abraham Isaac Silverman, Middlesex Hospital; Elfrida Elizabeth Ada Spencer, B.A., London School of Medicine for Women; Harold Edwin Thomas, University College; Frederick Henry Wickham Tozer and Mark Tree, London Hospital; Doris Lyne Veale, Norah Walden, Gladys May Watkinson, Agnes Edie Westwood, Agnes Sidney Wilkins, and Ada Kathleen Williams, London School of Medicine for Women; Samson Wright, Middlesex Hospital; Jacob Elias Zeitlin, London Hospital; Michael Israel Zimmerman, King's College.

* Awarded a mark of distinction.

N.B.—This list, published for the convenience of candidates, is issued subject to its approval by the Senate.

UNIVERSITY OF DURHAM: FACULTY OF MEDICINE.—At the Convocation held on March 31st the following degrees were conferred:—

Doctor of Medicine.—Idris David Evans and Robert Peart.

Bachelor of Medicine (*M.B.*).—Norman Braithwaite, Ernest Bramley, Richard Vere Brew, Stephanie Patricia Laline Hunte Taylour Daniel, Donald Henegan, James Dixon Johnson, John Kerr Ritchie Landells, Kamel Ibrahim Shalaby, Charles Rees Smith, and Iskander Sollman.

Bachelor of Surgery (*B.S.*).—Norman Braithwaite, Ernest Bramley, Richard Vere Brew, Horace George Bennett Dove, Donald Henegan, John Kerr Ritchie Landells, Kamel Ibrahim Shalaby, and Charles Rees Smith.

The following received the Diploma in Public Health (D.P.H.):—

Richard Julius Cyriax and Douglas Catterall Leyland Orton.

The following received the Licence in Dental Surgery (L.D.S.):—

Wilfred Phillipson Spence.

THROUGH a decision of their Joint Matriculation Board the Universities of Manchester, Liverpool, Leeds, Sheffield, and Birmingham have now come into line with other examining bodies in not requiring that Latin should be taken as an obligatory subject in the entrance examination to the Faculty of Medicine.

ROYAL COLLEGE OF PHYSICIANS OF LONDON.—An extraordinary Comitia of the College was held on April 2nd. Dr. Frederick Taylor, the President, occupied the chair and delivered the presidential address, in the course of which he first mentioned the changes in the College list, among them that the College had lost by death during the year 6 Fellows, 8 Members, 1 Extra-licentiate, and 195 Licentiates. Among the 8 Members was the senior Member, Dr. Horace B. Dobell, who founded the lecture which bears his name. A long and interesting list of honours, military and civil, conferred upon Fellows, Members, and Licentiates of the College was then read out, after which the lectures delivered during the past year were mentioned—namely, the Harveian Oration, by Sir Thomas Barlow; the Bradshaw Lecture, by Dr. H. W. G. Mackenzie; the FitzPatrick Lectures, by Dr. W. H. R. Rivers; the Horace Dobell Lecture, by Dr. H. R. Dean; the Lumleian Lectures, by Dr. G. A. Sutherland; the Goulstonian Lectures, by Dr. C. H. Miller; and the Oliver-Sharpey Lecture, by Dr. C. Bolton. The medals and scholarships awarded were next referred to, the fact that there were no candidates for the Murchison scholarship being announced. After reviewing the principal matters which had come before the President, the Comitia, and the various boards and committees, the President read obituary notices of the six Fellows who had died during the year—namely, Sir Lauder Brunton, Bart., Dr. William Orange, C.B., Dr. Duncan Burgess, Dr. W. W. H. Tate, Dr. William Cayley and Sir James F. Goodhart, Bart. A ballot was taken for the office of President, and Dr. Taylor was re-elected. After some formal business the Comitia was dissolved.

ROYAL INSTITUTE OF PUBLIC HEALTH.—A second course of lectures and discussions on "Public Health Problems under War and After-war Conditions" will be held in the lecture hall of the Institute on Wednesdays from April 18th to July 25th inclusive, at 4 P.M. The lectures range over a large area of immediately pressing topics, each of which is to be dealt with by an acknowledged expert, and discussion will follow the delivery of the lecture. Medical officers of health, medical practitioners, sanitarians, and others engaged in public health work are invited to attend. A syllabus of the course may be obtained on application to the secretary, 37, Russell-square, London, W.C.1.

METROPOLITAN ASYLUMS BOARD: DIPLOMA IN PUBLIC HEALTH.—A course of lectures and demonstrations (lasting three months) in hospital administration will be given at the North-Western Hospital, Lawn-road, Hampstead, London, N.W., by Dr. J. E. Begg, medical superintendent, on Tuesdays and Fridays at 5 P.M., beginning Tuesday, May 8th. The fee for the course is £3 3s., and further particulars may be obtained from the Clerk to the Metropolitan Asylums Board, Embankment, London, E.C.4.

INSTITUTE OF HYGIENE.—The Principal of the Institute, Mr. J. Grant Ramsay, delivered on March 29th a lecture on "The Problem of Food, Fitness and National Resources." Proper feeding was, he said, the foundation of fitness. He had come across strong healthy people in the worst slums of Europe, but always found that they were well fed; he had never met or heard of healthy people, even living in the best surroundings, who were badly fed. Proper feeding, however, did not necessarily mean high feeding or large feeding; it meant eating the right foods, in the right quantity, at the right time, and in the right way. Halliburton had advocated the eating of rather more than was actually essential, while Chittenden believed we were healthier with rather less than the accepted standard. Nature was very accommodating, and there was much to be said for both theories, but we had followed Halliburton so long that we could now afford to give Chittenden a chance. Those who could afford to do so should continue to buy the best foods and the best parts, leaving the food of the poor as far as possible to the poor, who were more influenced by habit, and would continue to buy what they had been accustomed to.

Appointments.

Successful applicants for vacancies, Secretaries of Public Institutions, and others possessing information suitable for this column, are invited to forward to THE LANCET *Office, directed to the Sub-Editor, not later than 9 o'clock on the Thursday morning of each week, such information for gratuitous publication.*

BENNETT, JAMES, M.R.C.S., L.R.C.P. Lond., D.P.H., has been appointed Medical Officer of Health to the Runcorn Rural District Council.

CLARKE, A. E., M.D. Lond., Certifying Surgeon under the Factory and Workshop Acts for Wickmansworth.

MACKENZIE, J. J. R., M.B., Ch.B. Edin., Certifying Surgeon under the Factory and Workshop Acts for Wansford, Northampton.

MOGG, J. A. H., L.R.C.P. & S. Edin., L.F.P.S. Glasg., Certifying Surgeon under the Factory and Workshop Acts for Woodstock.

NAISH, LUCY, M.B. Lond., Lady Tutor in Anatomy, *vice* Dr. Sophia Witts, resigned, in the University of Sheffield.

OUTRED, C. D., M.R.C.S., L.R.C.P. Lond., Certifying Surgeon under the Factory and Workshop Acts for Gravesend District.

ROSS, H., Certifying Surgeon under the Factory Act for the City of London, *vice* R. S. Mair.

SELLERS, W. H. I., M.B., C.M. Edin., M.R.C.S., to be one of the Medical Referees under the Workmen's Compensation Act, 1906, for County Court Circuit No. 4.

Vacancies.

For further information regarding each vacancy reference should be made to the advertisement (see Index).
When the application of a Belgian medical man would be considered the advertisers are requested to communicate with the Editor.

BARROW-IN-FURNESS, NORTH LONSDALE HOSPITAL.—House Surgeon. Salary £250 per annum, with board, &c.

BATH, EASTERN DISPENSARY.—Resident Medical Officer. Salary £140 per annum, with furnished rooms, &c.

BODMIN, CORNWALL COUNTY ASYLUM.—Female Junior Assistant Medical Officer. Salary £200 per annum, with board, &c.

BOLTON INFIRMARY AND DISPENSARY.—Second House Surgeon. Salary £200 per annum, with board, &c.

BRISTOL ROYAL HOSPITAL FOR SICK CHILDREN AND WOMEN.—Female House Surgeon. Salary £150 per annum, with board, &c.

BRISTOL ROYAL INFIRMARY.—House Physician and House Surgeon. Salary at rate of £120 per annum, with board, &c.

BURNLEY, VICTORIA HOSPITAL.—House Surgeon. Salary £160 per annum, with board, &c.

BURY INFIRMARY.—Junior House Surgeon. Salary £150 per annum, with board, &c.

CHARING CROSS HOSPITAL, Agar-street, W.C.—House Physician and House Surgeon. Salaries £100 per annum, with board, &c.

CHESTERFIELD AND NORTH DERBYSHIRE HOSPITAL.—House Surgeon. Salary £200 per annum, with board, &c.

CHICHESTER, ROYAL WEST SUSSEX HOSPITAL.—House Surgeon. Salary at rate of £150, and War Bonus at rate of £50 per annum, with board, &c.

GREAT NORTHERN CENTRAL HOSPITAL, Holloway-road, N.—Resident Medical Officer. Salary £200 per annum, with board, &c.

HOSPITAL FOR CONSUMPTION AND DISEASES OF THE CHEST, Brompton.—House Physician for six months. Salary 30 guineas.

HUDDERSFIELD, STORTHES HALL ASYLUM, Kirkburton, near Huddersfield.—Locum Tenens. Salary £7 7s. per week, with board, &c.

LEEDS PUBLIC DISPENSARY.—Second Female Resident Medical Officer. Salary £200 per annum, with board, &c.

LIVERPOOL, BROWNLOW HILL INSTITUTION.—Resident Assistant Medical Officer. Salary at rate of £300 per annum, with rations, &c.

LONDON TEMPERANCE HOSPITAL, Hampstead-road, N.W. 1.—Temporary Anæsthetist. Salary 25 guineas per annum.

MAIDSTONE, WEST KENT GENERAL HOSPITAL.—Assistant House Surgeon. Salary £125 per annum, with board, &c.

MANCHESTER, ANCOATS HOSPITAL.—House Physician. Salary £150 per annum, with board, &c.

MANCHESTER COUNTY ASYLUM, Prestwich.—Locum Tenens. Salary £7 7s. per week, with board, &c.

MANCHESTER NORTHERN HOSPITAL FOR WOMEN AND CHILDREN, Parkplace, Cheetham Hill-road.—House Surgeon. Salary £150 per annum, with board, &c.

NETLEY, WELSH HOSPITAL.—Medical Officer for Pathological Department. Salary £400 per annum, with board, &c.

NORTHAMPTON GENERAL HOSPITAL.—House Surgeon. Salary £150 per annum, with board, &c.

NOTTINGHAM, NOTTS EDUCATION COMMITTEE.—Female Assistant School Medical Officer. Salary £300 per annum.

QUEEN MARY'S HOSPITAL FOR THE EAST END, Stratford.—House Surgeon.

QUEEN'S HOSPITAL FOR CHILDREN, Hackney-road, Bethnal Green, E.—House Physician, Casualty House Surgeon, and House Surgeon for six months. Salary £100 per annum, with board, &c.

READING, ROYAL BERKSHIRE HOSPITAL.—Resident Clinical Assistant for six months. Salary £150, with board, &c.

ROTHERHAM HOSPITAL.—Junior House Surgeon. Salary £150 per annum, with board, &c.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.—Examiners.

ST. PETER'S HOSPITAL FOR STONE, ETC., Henrietta-street, Covent Garden, W.C.—Junior House Surgeon for six months. Salary at rate of £75 per annum, with board, &c. Also Junior Anæsthetist.

SERBIAN RELIEF FUND, 5, Cromwell-road, London, S.W. 7.—Medecin Chef to Hospital on Salonica Front.

SHEFFIELD ROYAL INFIRMARY.—House Physician. Salary £120 per annum, with board, &c.

SHREWSBURY, SHIRLETT SANATORIUM, Shropshire.—Temporary Assistant Resident Medical Superintendent. Salary £300 per annum.

WEST BROMWICH AND DISTRICT HOSPITAL.—Assistant House Surgeon. Salary £120 per annum, with board, &c.

WHITEHAVEN AND WEST CUMBERLAND INFIRMARY.—Resident House Surgeon. Salary £150 per annum, with board, &c.

WINCHESTER, ROYAL HAMPSHIRE COUNTY HOSPITAL.—Female Assistant Resident Medical Officer. Salary £250 per annum, with board, &c.

THE Chief Inspector of Factories, Home Office, London, S.W., gives notice of vacancies for Certifying Surgeons under the Factory and Workshop Acts at Brynamman and Bishop's Waltham.

Births, Marriages, and Deaths.

BIRTHS.

DOBRASHIAN.—On April 6th, at Oakley-square, N.W., the wife of Lieutenant G. Rowland Dobrashian, R.A.M.C., of a son.

HALLOWS.—On April 5th, at Gloucester-gate, Regent's Park, Mary, wife of Captain Norman F. Hallows, R.A.M.C., of a son.

KIDD.—On April 4th, at Harley-street, London, the wife of Frank Kidd, F.R.C.S., of a son.

PENNELL.—On April 2nd, at Winchmore Hill, N., the wife of Vernon Pennell, M.A., M.B., B.C. Cantab.—a son.

PINSON.—On April 5th, at Stockport-road, Cheadle, the wife of K. B. Pinson, M.B., M.R.C.S., of a daughter.

PRINGLE.—On March 30th, at Glaslyn Crescent-road, Ipswich, Jessie Eva (*née* Hart), M.B., B.S., the wife of Arthur Young Pringle, M.R.C.S., L.R.C.P., of a son.

RAINEY.—At Wakefield House, Eastbourne, the wife of Captain E. H. Rainey, R.A.M.C., of a daughter.

WEBB.—On April 4th, at Grosvenor-square, Southampton, the wife of Captain G. Harvey D. Webb, R.A.M.C., of a son.

MARRIAGES.

CARDEW—GRAEME MARSHALL.—On April 4th, at the Parish Church, Cheltenham, Arthur Barrett Cardew, M.C., F.R.C.S., R.A.M.C., of Overbury, Charlton Kings, to Nora Graeme Marshall, second daughter of the late James Marshall, of Hillhead, Glasgow.

FRASER—MELLOR.—On March 27th, at the Parish Church, Ashton-under-Lyne, Thomas Lochhead Fraser, Captain, R.A.M.C., to Dorothy Walton, only child of the late Mr. A. E. Mellor, J.P., of Springfield View, Ashton-under-Lyne.

KERBY—LEMAN.—On April 5th, at St. Mary's, Strand, by the Rev. Harcourt Hillersdon, Surgeon T. R. F. Kerby, R.N., to Lilian, only daughter of D. Jackson Leman, of Westbourne-terrace, W.

MORGAN-REED.—On March 30th, at Valparaiso, H. Lewis Morgan, F.R.C.S., to Minnie, daughter of Mr. and Mrs. Wm. Reed, Stockton-on-Tees.

PEARSE—WILBURN.—On March 30th, at St. Saviour's Church, Colgate, Captain Robin Pearse, F.R.C.S., C.A.M.C., of Toronto, to Amy Christine, eldest daughter of Mr. and Mrs. E. J. Wilburn, The Croft, Southwick.

DEATHS.

BARKER.—On April 5th, Henry Martyn Barker, M.D., of "Staincliff," Sandown, Isle of Wight.

BOULT.—On Palm Sunday, at St. Margaret's-terrace, St. Leonard's-on-Sea, Edmund Farrington Boult, Surgeon-Major, R.A.M.C. (retired), eldest son of the late Edmund Boult, F.R.C.S., of Bath.

JOY.—On April 1st, at the Manor House, Tamworth, Staffs, Charles H. Joy, M.D., aged 46 years.

MARR.—On Feb. 19th, at Bhusawal, India, of enteric, James Marr, M.B., C.M., District Surgeon, G.I.P. Railway, aged 47 years.

POTTER.—On April 9th, suddenly, Henry Percy Potter, M.D., F.R.C.S., for 37 years Medical Superintendent of Kensington Infirmary, in his 63rd year.

N.B.—A fee of 5s. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Short Comments, and Answers to Correspondents.

MEDICAL NOTES IN HISTORICAL MANUSCRIPTS: THE STUART PAPERS.

FOLLOWING are some further excerpts from Part VI. of the Stuart Papers. The first instalment appeared in THE LANCET of April 7th, p. 558.

Death of Queen Mary.

The Earl of Panmure to the Duke of Mar.—1718, May 9, Paris.—"The Queen was taken ill on Sunday the 1st, which I did not know till Monday evening, so I went to St. Germains Tuesday morning and Dr. Blair went with me. They told us there that the Queen was better and that they did not think her in any danger. Dr. Blair did not then see her nor was his advice asked, but on Saturday morning an express came for him, so he went to St. Germains in all haste, but found her speechless, and past all hopes of recovery, for she died about two hours after. I'm told that Dr. Garvan and the King of France's physicians thought she was in no danger the night before and were resolved to have given her physic the next day, but I will not enlarge on so melancholy a subject."

Father Gaillard, the Queen's Confessor, to James III.—1718, May 9, St. Germains.—"Il s'agit de vous instruire en detail pour votre consolation premierement de ce qui s'est passe dans cette sainte mort et secondement de ce qui vous y regarde personnellement par les sentimens que la Reyne m'a marqués a vostre égard et par tout ce qu'elle ma chargé de vous ecrire. Premier article de ce qui c'est passe à la mort de la Reyne: Il y avoit quelque temps environ un mois que la Reyne avoit esté attaquée d'un rhûme qui disparoissoit quelquefois, et qui de temps en temps sa renouvelloit n'estant pas toutafait gueri. La Reyne se portoit assez bien le dimanche, premier jour de may, feste de St. Jaques et St. Phillippe. C'estoit le jour qu'elle avoit choisi pour remplir l'heure de son adoration devant le St. Sacrement, s'estant associée a la confrairie de parroisse de St. Germain. Sa Majesté se rendit pour cela a l'eglise de la parroisse cinq heures du dimanche apres disner ayant fait ses devotions a l'ordinaire le matin dans sa chapelle et y ayant recité le rosaire a quatre heures a la maniere accoutumée. Le St. Sacrement fut exposé à la parroisse des que la Reyne y fut arrivée un peu avant cinq heures. La Reyne commenca son adoration à genoux où elle se tint pendant une demiheure, et fut assise sur ses jambes la demiheure suivante, n'ayant pas voulu s'asseoir sur son fauteuil qui luy estoit preparé. L'heure de l'adoration finie, le salut fut commencé à six heures, auquel elle assista à genoux. En suite elle monta dans son carrosse pour s'aller promener sur la terrasse ou elle sentit du froid. C'est ce qui la fit retourner apres demiheure de promenade sans pourtant s'estre trouvée incommodée, car elle soupa ce soir la avec plus d'appetit qu'elle n'avoit fait depuis longtemps. Elle sa coucha a l'heure ordinaire, mais elle passa assez mal la nuit jusqu'a cinq heures du matin du lundy qu'elle fut saisie du frisson de la fievre qui dura une heure, ce qui fut suivi de la chaleur. C'est ce qui fut compté pour peu de chose. Je fus apellé et j'eus l'honneur de s'entretenir selon tous les sentimens de sa pieté. Cette fievre n'a point cessé jusqu'au dernier jour de sa mort, elle parût plus considerable par les redoublemens qui survenoient, l'un le matin plus leger, l'autre sur les quatre heures de l'apres disner, qui commençoit par une toux assez violente, c'est ce qui a duré jusqu'au dernier jour. La nouvelle de cette maladie ayant esté seeûe à Paris, Monseigneur le Mareschal de Villeroy par son zele très vif et très fidelle par la Reyne me fit l'honneur de m'ecrire pour offrir à la Reyne les medecins de la cour, qu'elle souhaiteroit Sa Majesté demanda Monsieur Dodart, aujourd'huy premier medicin du roy, et Monsieur Boudin. Ce sont les deux qui la traittement dans sa grande maladie dernière. Ces medecins sont venus tous les jours depuis mardy jusqu'au vendredy, veille de la mort. D'abort ils ne trouverent rien de mortel dans cette fievre, ils ordonnerent une second saignée, la premiere ayant esté faite des le lundy par l'ordre de Mr. le chevalier Garven. Cette suite de redoublements et de toux les a embarrassés, mais ils n'en ont pas paru trop alarmés. Le mercredy et jeudy se passerent de mesme facon et mesme la nuit du jeudy au vendredy fut si bonne qu'on commenca à mieux esperer et mesmes on ordonna une medicine pour le lendemain, same ty. Pendant tout le temps la j'ay rendu mes assidu'tés à la reyne, la messe tous les jours, et les prieres ont esté dites dans sa chambre. Des le jeudy la reyne demanda a se confessor. Les medicins me prierent de l'en detourner, de peur que la preparation à la confession ne donnat quelque agitation, qui lut pû troubler le bon estat qui sembloit s'establir. Je priay la reyne de differer sa confession. Le lendemain, vendredy, elle m'en parla encore avec quelque inquietude de mourir, disoit elle, sans confession. Ce qui me determina à consentir à sa demande fut une toux très forte et un redoublement tres violent qui la prit vers les cinq heures du vendredy peu apres que les medecins furent partis avec esperance de la trouver mieux le lendemain, disant pourtant qu'ils trouvoient la fievre bien ardente. Je traitty alors avec la reyne l'affaire de la confession sur l'empressement qu'elle m'avoit marqué. Pour la delivrer de tout inquietude je la priay de prendre tranquillement tout cette preparation, qu'il falloit faire tranquillement sans manquer à prendre tous les soulagemens qui devoient l'interrompre. Ainsi fut il fait. La reyne me fit sa confession avec les sentimens ordinaires de sa grande piété, et de son vif amour pour Dieu dans une grande paix. Quelque heure apres on trouva que la reyne s'afoiblissoit, et que la violence du mal s'augmentoit. Je pris avis de Mr. Garveo, s'il jugeoit qu'il fut temps de luy faire recevoir les derniers sacremens. Il en fut d'avis, je n'eus nulle peine à en informer la reyne, qui n'en fut pas plus emue que si on luy avoit dit d'aller entendre la messe dans les temps de sa santé. Je fis avertir Monsieur le prieur, curé de la parroisse, pendant que j'estois attaché à preparer la reyne à la reception des divins sacremens. L'extreme onction luy fait premierement donnés par M. le Curé, et en suite le st. viatique. Avant que de la recevoir, elle fit demander pardon à toute l'assistante des peines qu'elle avoit pu faire a qui que ce soit, donc monsieur le curé fit le recit public. Depuis ce temps la, ou tout fut achievé à onze heures et demie du vendredy, jusqu'au lendemain sept heures et demie du samedy la reyne ne voulot plus s'entretenir qu' avec Dieu. Elle demanda les prieres des agonisans sur les deux heures apres minuit. Comme on les faisoit au pieds de son lit, elle ordonna qu'on s'aprochat pour les mieux entendre et y répondre. Les prieres ont esté faits deux fois par messieurs les aumosniers de la reyne, auquels je repondois. Mon occupation fut depuis onze heures et demie du soir vendredy jusqu'à sept heures et demie samedy de me tenir auprès de la reyne, et de me presenter de temps en temps à elle pour luy fournir des sentimens de piété. Certainement elle n'en avoit pas besoin, Car Dieu luy inspiroit luy mesme les plus dévots sentimens. ..... Elle voulut avoir le crucifix entre ses mains et sous ses yeux, et tout cela partagé entre les prieres que l'on faisoit aupres d'elle, et les sentimens qu'elle prenoit ou d'elle mesme ou de ce que je luy suggerois. Tout cela s'est passé avec toute la presence de son esprit, pendant que le corps se détruisoit par l'oppression de la poitrine ou tout le mal a abouti et par l'inflammation qui s'y est faite, mais avec quelle douce patience a elle tout souffert pendant la durée de huit heures apres les sacremens receus, ayant toujours non seulement l'esprit mais la parole libre jusques à un quart d heure avant sa mort, et mesmes dans ce quart d'heure, elle me donna des signes qu'elle entendoit tout ce qui je luy disois sans pouvoir former des paroles pour y repondre. Ainsi, ainsi cette sainte reyne s'est elle endormie au Seigneur, auquel de samedy matin 7e may, 1718. J'avois oublié qu'a quatre heures du matin elle demanda que la messe fut dite dans sa chambre à quoy elle s'unit par toute l'affection de son cœur. 2nd Article: Voicy ce qui vous regarde personnellement, dans les sentimens de la reyne, vous avés connu son cœur tendrement maternel, qui s'est toujours conservé tel jusqu'a sa mort, vous n'ignorés pas aussi les peines qu'elle a ressenties sur les derniers ordres qu'elle avoit receus de votre Majesté. Très persuadée de toute vostre affection elle m'a ordonné de vous mander que tout ce qui luy estoit venu de vostre part, quoyque contraire à ses pensées et à ses inclinations, n'avoit fait aucune impression contraire à son affection et qu'elle ne vous scavoit aucun mauvais grè, mais qu'elle vous prioit de luy pardonner toutes les peines qu'elle auroit pu vous faire par les petites contestations, sur quoy elle m'a ordonné en termes exprès de vous dire de sa part les choses les plus tendres et de vous asseurer qu'esperant la misericorde de Dieu elle prieroit le Seigneur dans le ciel pour le succes de vos affaires presentes. j'ay cru mesmes avoir entendu qu'elle a nommé particulierement l'affaire des Suedois. D'ailleurs, en recevant le st. viatique, ayante demandé qu'on priat pour elle, elle ajouta pour le roi, mon fils, afin qu'il perde mille vies plutost que de souffrir la moindre alteration de sa foy, ce qui fut repeté tout haut par M. le curé, lors que de la part de la reyne il dit, que sa Majesté demandoit pardon de toutes les peines qu'elle avoit pu faire à qui que ce soit. En suite elle s'est fait aporter un petit crucifix, qu'elle a mis entre les mains de madame de Molza avec ordre de vous l'envoyer de sa part, ce qu'elle luy a encore reitere une autrefois, afin que son ordre sur ce sujet sois fidellement executé."

Sir Hugh Paterson to the Duke of Mar.—1718, May 20, Rotterdam.—"We have now the afflicting news confirmed of the good Queen's death. By a letter I have seen from one that was present during her sickness till her death I find that the physicians that attended her are much blamed for their conduct, and, since I mention this, I must tell you that many of the King's friends both here and at home seem concerned that he has not a more skilled physician and of a better character about his person than the one they hear is at present with him. I remember very well, when the Princess died, that some of those then present complained very much, in their letters to England, of the conduct of the physicians that attended her and that he that's now with the King was particularly blamed about it. I hope he shall have very little occasion for the advice of any of them, but, should it please God to make it otherwise, it would be no small grief and uneasiness to his friends to think he should want the attendance of a prudent skilled physician, which I must take the liberty of saying Dr. Macgie is far from being thought. I have often been pressed by many to represent this, which I have omitted doing till now; therefore, if it's thought officious, I hope it will be excused, since it proceeds from no other motive than a true zeal for the King's welfare."

(To be concluded.)

DRUGGING BY A DENTIST.

To the Editor of THE LANCET.

SIR,—I was last night called to see a patient who gave me the following account. He had that day been to see a dentist who was treating him for a carious tooth, to which the dentist applied a dressing and gave him a bottle containing 42 pills, each of which, according to the label on the bottle, contained morph. sulph. gr. ¼. He was directed to take one to three till relieved of pain. Fortunately, after taking two he felt ill and sent for me.

I am, Sir, yours faithfully,

Bradford, April 3rd, 1917. W. GILCHRIST BURNIE.

THE MANGOLD WURZEL.

THE Food Controller has just issued recipes for cooking mangold wurzels. In this connexion the following paragraph from "The Dictionary of the Farm," by the Rev. W. L. Rham, vicar of Winkfield, Berkshire (1773-1843), a book which was very popular in its time, is of interest to medical men:—

> The common field-beet for cattle, which has long been known in Germany, was introduced into England at the latter end of the last century; and its introduction is generally attributed to the late Dr. Lettsom, a physician of reputation, and a member of the Society of Friends. The German name is "mangold wurzel" or "mangold" root, but it is commonly pronounced "mangel wurzel," which means

scarcity root; and by a strange translation it is called in French *racine d'abondance*, or root of plenty, as well as *racine de disette*, or root of scarcity. The name of "field-beet" is much more appropriate.

Mr. Rham also supplies much further information concerning the mangold and its cultivation. In the Dictionary of National Biography it is stated that John Coakley Lettsom translated a pamphlet on the subject from the French of Abbé de Commerell in 1787, grew the mangold himself, and imported a large quantity, which he distributed to farmers and others in this country as well as in Europe, America, and the West Indies.

The following are three recipes for cooking the mangold wurzel issued by the Food Controller:—

Recipe 1.—Ingredients: 1 lb. mangold wurzel, ½ lb. vegetable butter or dripping, 2 small onions, pepper and salt.

Cook the mangold wurzel in the butter for about 20 minutes, or until tender. Then add the onion (which has been previously chopped) and pepper and salt. Drain for a moment before serving on cooked lentils, buttered rice, or cheese sauce.

Recipe 2.—Ingredients: 1 lb. mangold wurzel; 2 oz. vegetable butter or dripping; 2 tablespoonfuls of stock (vegetable or meat); a little pepper and salt.

Cut the mangold wurzel into small dice. Dust them in wholemeal flour. Place in saucepan together with the butter and stock, and let simmer till tender, but care must be taken that the mixture does not boil. Serve as a vegetable.

Recipe 3.—Ingredients: 1 lb. mangold wurzel.

Cut into dice and cook as for No. 1. Drain and then dip into a batter made from the following: 1 egg; ½ lb. flour; 2 oz. breadcrumbs; sufficient milk to make a nice frying batter. Fry in vegetable butter and other cooking butter or dripping.

Medical Diary for the ensuing Week.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

MEETINGS OF SECTIONS.

Thursday, April 19th.

DERMATOLOGY (Hon. Secretaries—J. E. R. McDonagh, Henry MacCormac): at 5 P.M.

Paper:

Major H. MacCormac: Skin Diseases as seen in War Conditions in France.

N.B.—No cases will be shown at this Meeting.

Friday, April 20th.

ELECTRO-THERAPEUTICS (Hon. Secretaries—E. P. Cumberbatch, R. Knox): at 8.30 P.M.

Paper:

Dr. H. J. Gauvain: Heliotherapy and X Rays in the Treatment of Surgical Tuberculosis.

ROYAL MICROSCOPICAL SOCIETY, 20, Hanover-square, W.

WEDNESDAY.—8 P.M., Dr. E. C. Hort and Mr. F. M. Duncan: The Life-history of the Meningococci and Other Bacteria.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.

Museum Demonstrations (Pathology) for Medical Students and Practitioners and First-Aid and Ambulance Students:—

MONDAY.—5 P.M., Mr. S. G. Shattock: Syphilis.

POST-GRADUATE COLLEGE, West London Hospital, Hammersmith-road, W.

MONDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye. Dr. Simson: Diseases of Women.

TUESDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

WEDNESDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations.

THURSDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye.

FRIDAY.—10 A.M., Dr. Simson: Gynecological Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

SATURDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. Mr. B. Harman: Eye Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations.

ROYAL INSTITUTE OF PUBLIC HEALTH, Lecture Hall of the Institute, 37, Russell-square, W.C. 1.

Course of Lectures and Discussions on Public Health Problems under War and After-war Conditions:—

WEDNESDAY.—4 P.M., Lecture I.:—Sir Robert Armstrong-Jones, M.D.: Mental States and the War. Followed by a discussion.

The following journals, magazines, &c. have been received:—British Journal of Ophthalmology, British Journal of Children's Diseases, New Zealand Medical Journal, Journal of the Missouri State Medical Association, Archives of Internal Medicine, Quarterly Journal of Experimental Physiology, Practitioner, American Medicine, Dublin Journal of Medical Science, Archives de Médecine et Pharmacie Navales, British Dental Journal, Edinburgh Medical Journal, British Journal of Dental Science.

EDITORIAL NOTICES.

IT is most important that communications relating to the Editorial business of THE LANCET should be addressed *exclusively* "TO THE EDITOR," and not in any case to any gentleman who may be supposed to be connected with the Editorial staff. It is urgently necessary that attention should be given to this notice.

It is especially requested that early intelligence of local events having a medical interest, or which it is desirable to bring under the notice of the profession, may be sent direct to this office.

Lectures, original articles, and reports should be written on one side of the paper only, *and when accompanied by blocks it is requested that the name of the author, and if possible of the article, should be written on the blocks to facilitate identification.*

Letters, whether intended for insertion or for private information, must be authenticated by the names and addresses of their writers—not necessarily for publication.

We cannot undertake to return MSS. not used.

Offices: 423, STRAND, LONDON, W.C. 2.

MANAGER'S NOTICES.

ALTERATION IN THE PRICE OF "THE LANCET."

INCREASED war expenses and cost of production necessitate an increase of the price of THE LANCET. Commencing with the new year, the price was raised to 8*d*. The rates of subscription remain as revised in October.

INLAND.

One Year	£1 10 0
Six Months	0 16 0
Three Months	0 8 0

COLONIES and ABROAD.

One Year	£1 12 6
Six Months	0 17 6
Three Months	0 8 9

Subscriptions (which may commence at any time) are payable in advance. Cheques and Post Office Orders (crossed "London County and Westminster Bank, Covent Garden Branch") should be made payable to the Manager, Mr. CHARLES GOOD, THE LANCET Offices, 423, Strand, London, W.C. 2.

TO SUBSCRIBERS.

WILL Subscribers please note that only those subscriptions which are sent direct to the Proprietors of THE LANCET at their Offices, 423, Strand, London, W.C. 2, are dealt with by them? Subscriptions paid to London or to local newsagents (with none of whom have the Proprietors any connexion whatever) do not reach THE LANCET Offices, and consequently inquiries concerning missing copies, &c., should be sent to the Agent to whom the subscription is paid, and *not* to THE LANCET Offices.

Subscribers, by sending their subscriptions direct to THE LANCET Offices, will ensure regularity in the despatch of their Journals and an earlier delivery than the majority of Agents are able to effect.

ADVERTISEMENT RATES.

Books and Publications ... ...
Official and General Announcements
Trade and Miscellaneous Advertisements and Situations Vacant ... ... } Five lines and under ... ... 4*s*. 0*d*.

Every additional line, 6*d*.

Situations Wanted: First 30 words, 2*s*. 6*d*.

Per additional 8 words, 6*d*.

Quarter Page, £1 10*s*. Half a Page, £2 15*s*.

Entire Page, £5 5*s*.

Special terms for Position Pages.

Advertisements (to ensure insertion the same week) should be delivered at the Office not later than Wednesday, accompanied by a remittance.

METEOROLOGICAL READINGS.

(Taken daily at 8.30 a.m. by Steward's Instruments.)

THE LANCET Office, April 11th, 1917.

Date.	Rainfall.	Solar Radio in Vacuo.	Maximum Temp. Shade.	Min. Tem.	Wet Bulb.	Dry Bulb.	Remarks.
April 5	...	90	52	34	36	37	Fine
,, 6	...	86	48	33	37	38	Snowing
,, 7	0·23	76	46	33	34	35	Fine
,, 8	...	83	51	32	39	42	Fine
,, 9	0·04	75	48	39	38	39	Cloudy
,, 10	0·14	76	43	35	33	35	Cloudy
,, 11	0·19	80	44	34	35	35	Snowing

Other information which we have been accustomed to give in these "Readings" is withheld for the period of the war.

BOOKS, ETC., RECEIVED.

AMERICAN PEDIATRIC SOCIETY (Secretary, Dr. H. C. CARPENTER), 1805, Spruce-street, Philadelphia, Pa., U.S.A.
Transactions. Edited by L. E. La Fétra, M.D. Vol. XXVIII.

BAILLIÈRE, TINDALL, AND COX, London.
Chemistry for Beginners. By C. T. Kingzett, F.I.C., F.C.S. 2s. 6d. net.

BELL, G., AND SONS, London.
Happy Warrior and other Poems. By Augustus H. Cook, M.B. Lond. 2s. net.

CAMBRIDGE UNIVERSITY PRESS.
Finch and Baines: A Seventeenth Century Friendship. By Archibald Malloch, B.A., M.D., Temporary Captain, Canadian Army Medical Corps. 10s. 6d. net.

CONSTABLE AND CO., LTD.
Ambulance No. 10: Personal Letters from the Front. By Leslie Buswell. 3s. 6d. net.

DUNOD, H., ET PINAT, E., 47 et 49, Quai des Grands-Augustins, Paris, VIe.
Organisation Physiologique du Travail. Par Jules Amar, Directeur du Laboratoire des recherches sur le travail professionnel au Conservatoire National des Arts et Métiers. Préface de H. le Chatelier, Membre de l'Institut. 18 fr.

GEORGE WILLIAM HOOPER FOUNDATION FOR MEDICAL RESEARCH, University of California Hospital, Second and Parnassus-avenues, San Francisco, U.S.A.
Collected Reprints. Vol. I., 1915-1916.

HARRISON AND SONS, London.
Acute Appendicitis: Practical Points from 25 Years' Experience. By C. Hamilton Whiteford, M.R.C.S., L.R.C.P. 4s. net.

HEINEMANN, WILLIAM, London.
Painless Childbirth: A General Survey of all Painless Methods, with Special Stress on "Twilight Sleep" and its Extension to America. By Marguerite Tracy and Mary Boyd.

LAURIE, T. WERNER, London.
War. By Pierre Loti. Translated by Marjorie Laurie. 2s. 6d. net.
Regimental Silhouettes. By C. Gribble. With Preface by Sir H. L. Smith-Dorrien, G.C.B., G.C.M.G., D.S.O. 1s. net.

TIMES OF INDIA, Bombay.
Sanitation in India. By J. A. Turner, C.I.E., M.D., D.P.H., and Others. Second edition.

URGENCY CASES HOSPITAL, 37, Queen's-gate, S.W.
Le Faux Miroir—Reflections from the Urgency Cases Hospital. 2s. 6d.

WRIGHT, J., Bristol. SIMPKIN, MARSHALL, London.
Index of Differential Diagnosis of Main Symptoms. Edited by Herbert French, M.A., M.D. Oxon., F.R.C.P. Lond. Second edition. 42s. net.

Communications, Letters, &c., have been received from—

A.—Lieut.-Col. W. Alpin, I.M.S.; Anglo-French Drug Co., Lond.; Messrs. Arnold and Sons, Lond.; *Answers*, Editor of; Messrs. Allen and Hanburys, Lond.; Anglo-American Pharmaceutical Co., Croydon; Archives Médicales Belges, Beveren-sur-Yser; Messrs. R. Anderson and Son, Edinburgh; Dr. A. Abrahams.

B.—Dr. S. A. Brown, New York; British Drug Houses Co., Lond.; Messrs. Burroughs Wellcome and Co., Lond.; Board of Missions, Nashville, U.S.A., Secretaries' Asst.; Mrs. Burroughs, Lond.; Miss A. J. Brown, Lond.; Messrs. Brentano, Paris; Messrs. W. H. Bailey and Son, Lond.; Mr. J. M. Barwick, Yeadon; Capt. S. G. Billington, R.A.M.C.; Dr. G. Booth, Chesterfield; Major F. C. Bell, C.A.M.C.; British Medical Association, Wandsworth Division, Hon. Sec. of; Dr. G. Blacker, Lond.; Messrs. Butterworth and Co. (India), Calcutta; Board of Education, Lond.; Messrs. W. A. Bates, Leicester; Dr. W. G. Burnie, Bradford; Major W. Blackwood, R.A.M.C.; Mr. W. Bryce, Edinburgh.

C.—Miss A. B. Clark, Ardersier; Dr. F. G. Crookshank, Lond.; Messrs. Cutting and Underwood, Lond.; Dr. D. F. Curjel, Agra; Messrs. E. Cook and Co., Lond.; Messrs. Carters, Lond.; Chicago School of Sanitary Instruction; Central Committee for National Patriotic Organisation, Lond., Sec. of; Chesterfield Hospital, Sec. of; County Asylum, Prestwich, Medical Supt. of.

D.—Messrs. W. Dawson and Sons, Lond.; Dr. W. A. Daley, Bootle; Mr. F. N. Doubleday, Lond.; Dr. R. Donaldson, Reading; Sir James M. Davidson, Lond.; Dr. W. F. Dearden, Manchester.

E.—Dr. J. R. Eddison, Leeds; Dr. H. A. Ellis, Middlesbrough; Dr. L. Ettinger, Swindon; Messrs. Evans, Sons, Lescher, and Webb, Lond.; Erasmic Co., Warrington; Lieut.-Col. T. R. Elliot, R.A.M.C.; Capt. E. Emrys-Roberts, R.A.M.C.

F.—The Food Controller, Lond.; Mr. E. Finch, Sheffield; Messrs. W. H. Findon and Co., Swindon; Lieut.-Col. C. G. Fagan.

G.—Surg. P. C. Gibson, R.N.; Capt. N. F. Graham, R.A.M.C.; Messrs. Gordon and Gotch, Lond.; Mr. A. E. Getting, St. Leonards-on-Sea; Sir William Grey-Wilson, K.C.M.G., Lond.; Dr. A. Graham-Stewart, Blackpool; Mr. J. B. Graham, Bangor; Dr. J. G. Gordon-Munn, Norwich; Capt. N. C. Graham, R.A.M.C.; Dr. R. R. Giddings, Nottingham; Capt. N. Graham, R.A.M.C.(S.R.).

H.—Mr. H. Hall, Lond.; Messrs. Edwin Hancock and Co., Bath; Lieut.-Col. D. Harvey, R.A.M.C.; Messrs. A. Heywood and Son, Manchester; Mr. J. G. Haller, Lond.; Dr. W. C. Hutt, Brighton; Messrs. Howards and Sons, Ilford; Mr. C. G. Hentsch, Milford-on-Sea; Lieut. J. T. Hyatt, R.A.M.C.; Hunterian Society, Acting Hon. Sec. of; Capt. G. S. Hughes, R.A.M.C.(T.); Hospital for Epilepsy and Paralysis, Lond., Sec. of; Capt. J. F. Hill, R.A.M.C.; Messrs. A. Heywood and Son, Lond.; Capt. F. Hernaman-Johnson, R.A.M.C.; Mr. W. Heinemann, Lond.; Surg.-Gen. V. Hurley, A.I.F.

I.—Capt. A. C. Inman, R.A.M.C.; Incorporated Society of Trained Masseuses, Lond.; India, Medical Services in, Director of, Simla.

J.—*Journal of the Royal Army Medical Corps*; Mr. C. A. Joll, Lond.; Dr. W. H. Judson, Lond.; Lieut. W. L. Johnston, R.A.M.C.; Dr. J. E. L. Johnston, Minna; Jeyes' Sanitary Compounds Co., Lond.

K.—Dr. E. H. Kitchen, Parkstone; Messrs. J. Keele, Lond.; Messrs. J. F. Keogh and Co., Dublin; Lieut.-Col. E. Kidd, R.A.M.C.; Messrs. R. A. Knight and Co., Lond.

L.—*Laboratory Journal*, Editor of; Capt. A. H. Lowe, R.A.M.C.; Mr. J. B. Lyth, Lond.; Messrs. H. K. Lewis and Co., Lond.; Liverpool Guardians, Clerk to the; Leeds Public Dispensary, Sec. of; London Dermatological Society, Hon. Sec. of; London Hospital Medical College, Sec. of; Dr. W. Lonsdale, Lond., Messrs. Longmans' Advertising Agency, Lond.; Mr. J. Little, Melbourne; Mrs. H. G. Leyton, Lond.; Dr. O. Leyton, Lond.

M.—Capt. O. De Muth, R.A.M.C.; Dr. R. H. Marten, Adelaide; Surg. R. G. Morgan, R.N.; Messrs. C. Mitchell and Co., Lond.; Messrs. McDowell, Steven, and Co., Falkirk; Maltine Manufacturing Co., Lond.; Messrs. Jas. Maclehose and Sons, Glasgow; *Midland Counties Herald*, Birmingham; Dr. R. S. Mair, Lond.; Mr. J. E. R. McDonagh, Lond.; Messrs. R. Maurice and Co., Lond.; Dr. R. Morton, Lond.; Mr. J. H. Makin, Manchester; Capt. J. Miller, R.A.M.C. (T.); Mr. J. McCulloch, Glasgow; Dr. A. Morison, Lond.; Dr. L. B. Merian, Zürich; Metropolitan Asylums Board, Lond., Clerk to.

N.—Sir T. B. Nariman, Bombay; North Lonsdale Hospital, Barrow-in-Furness, Sec. of; Notts County Council, Nottingham, County Medical Officer of Health of; Dr. L. Nicholls, Colombo.

O.—Mr. J. Offord, Lond.

P.—Lieut. F. G. Pedley, R.A.M.C.; Post Office Western Central District, Acting Postmaster of; Price's Patent Candle Co., Lond.; Dr. D. P. Penhallow, Paignton; Sir Arthur Pearson, Bart., Lond.; Dr. E. O. Price, Bangor; Mr. K. Parkes, Lond.; Mr. J. Penoyre, Lond.; Mr. H. Platt, Manchester; Messrs. Partridge and Love, Bristol; Messrs. Parke, Davis, and Co., Lond.

Q.—Messrs. Quibell Bros., Newark.

R.—Major C. Russell, C.A.M.C.; Dr. R. R. Rentoul, Liverpool; Royal Surrey County Hospital, Guildford, Asst. Sec. of; Messrs. Richardson and Co., Lond.; Royal Hampshire County Hospital, Winchester, Sec. of; Royal West Sussex County Hospital, Chichester, Sec. of; Messrs. E. J. Reid and Co., Lond.; Royal Institute of Public Health, Lond., Acting Sec. of; Dr. C. S. Redmond, East Ham; Royal Sanitary Institute, Lond., Sec. of; Royal Faculty of Physicians and Surgeons, Glasgow.

S.—Dr. G. A. Sutherland, Lond.; Mr. A. Stenhouse, Glasgow; Dr. F. D. Simpson; Storthes Hall Asylum, Kirkburton, Clerk to the; Saccharin Corporation, Lond.; Dr. E. M. Smith, Lond.; Messrs. Stevens, Lond.; *St. Paul Medical Journal*, St. Paul, U.S.A.; H.M. Stationery Office, Lond.; Messrs. G. Street and Co., Lond.; Capt. A. G. Shera, R.A.M.C.; Dr. Durgananda Sen, Midnapur; Mr. G. V. Sims, Brighton; Dr. A. Sayba, Cairo; Sir George Savage, Lond.; Mr. W. Stuart-Low, Lond.; School of Physic in Ireland, Dublin, Registrar of; Capt. N. I. Spriggs, R.A.M.C.; Society of Public Analysts, Lond., Joint Hon. Sec. of; Miss J. L. Shaw, Zürich.

T.—Messrs. W. Thacker and Co., Lond.; Mr. W. H. Thomas, Bath; Dr. J. Tatham, Old Oxtead; Capt. F. L. Tulloch, R.A.M.C.; *The Times of India*, Bombay; Thames Export Packing Co., Lond.; Messrs. J. Towne and Co., Melton Mowbray; Temple of Service, Lond., Hon. Sec. of.

U.—University of Durham Faculty of Medicine.

V.—Victoria Hospital, Burnley, Sec. of.

W.—Surg. F. A. Williamson, R.N.; Col. C. Wallace, A.M.S., C.M.G.; West London Hospital Post-Graduate College, Dean of; Dr. L. Wainwright, Lond.; Mr. J. H. Walters, Reading; Prof. S. White, Sheffield; West London Medico-Chirurgical Society, Hon. Sec. of; Capt. C. W. Wirgman, R.A.M.C.(T.F.); West Kent General Hospital, Maidstone, Sec. of; Messrs. J. Wright and Sons, Bristol; Capt. J. C. Walker, R.A.M.C.; Welsh Hospital, Netley, Officer Commanding; West Bromwich District Hospital, Sec. of; Major W. I. De C. Wheeler, R.A.M.C.; Wellcome Bureau of Scientific Research, Lond., Sec. of.

Z.—Dr. K. G. Zwick, Berne.

Letters, each with enclosure, are also acknowledged from—

A.—Lady Adair, Dunadry; Messrs. Anderson and Son, Lond.; A. F.

B.—Mrs. Blackwood, Camborne; Messrs. Butterfield and Son, Northampton; Dr. R. Brown, Kenley; Mrs. Bird, Godalming; Fleet-Surg. R. Bankhart, R.N., C.V.O.; Mrs. Aston Bunis, Lond.; Mrs. Burges, Hartley Wintney; Drs. Brookhouse and Montgomery, Bromley; Dr. W. R. Boyd, Richmond; Miss B. Bellamy, Lond.; Mr. R. W. Burkett, Nairobi; Mr. C. J. Bond, Leicester; Dr. W. E. Burton, St. Kitts; Messrs. Browning and Co., Lond.; Bristol Myers Co., New York.

C.—Capt. A. G. Clark, R.A.M.C.

D.—Capt. J. F. Dixon, R.A.M.C.; Dundee Corporation.

E.—E. F.

F.—Mr. W. S. Penwick, Lond.; Messrs. Fannin and Co., Dublin; Capt. P. Figdor, R.A.M.C.; Messrs. Fannin and Co., Lond.; Dr. D. Fenton, Blackburn; Messrs. Fairchild Bros. and Foster, Lond.; F. S. L.

G.—*Gazette Médicale de Paris*; Mr. P. Grogono, Lond.; G. N. A.; Capt. J. C. Glen, R.A.M.C.; Mr. J. N. Goldsmith, Lond.; Messrs. Grantham and Co., Reading.

H.—Dr. G. D. Henderson, Holyoke; Hoffmann-La Roche Chemical Works, Lond.

I.—Institute of Massage, Manchester.

J.—Dr. C. S. Jaffe, Lond.

L.—London Temperance Nurses' Co-operation, Sec. of; London Association of Nurses, Sec. of; Dr. H. C. Lane, Aberdeen, U.S.A.

M.—Mr. J. C. Mead, Lowestoft; Prof. C. A. Morton, Bristol; Mr. A. Macdougall, Glasgow; Messrs. Mertens and Co., Lond.; Lieut.-Col. McLaughlin.

N.—Messrs. F. Newbery and Sons, Lond.; Mr. S. Neave, Ingatestone.

P.—Mrs. Page, Blakeney; Mr. C. J. Palmer, Mansfield Woodhouse; Mr. J. Pracy, Lond.; Capt. D. H. Pennant, R.A.M.C., D.S.O.; Dr. V. Pennell, Lond.; Mrs. Phillips, Lond.

R.—Mr. J. Reynolds, Stockport; Dr. W. Raine, West Hartlepool; Royal College of Surgeons of England, Lond., Sec. of; Redruth Rural District Council, Clerk to the; Dr. M. J. Ryan, Crumlin; Dr. W. G. Reynolds, Shameen; Rockefeller Foundation, New York; Dr. J. N. Reynolds, Lond.; Surg.-Gen. H. D. Rolleston, R.N., C.B.

S.—Capt. J. F. Smith, R.A.M.C.; Salford Royal Hospital, Sec. of; Mrs. Symonds, Oxford; Messrs. W. H. Smith and Son, Lond.; Messrs. Saward, Baker, and Co., Lond.; Mr. H. C. Stephens, Lond.; Messrs. Sawyer, Lond.

T.—Mr. R. H. Tasker, Bristol; Mr. G. G. Turner, Newcastle-on-Tyne; Dr. J. Batty Tuke, Polton.

V.—Messrs. Gerth Van Wyk and Co., Lond.

W.—Dr. J. Weir, Lond.; Capt. A. W. G. Woodforde, R.A.M.C.; Mr. G. H. Widger, Limpsfield; Dr. J. F. Wilkinson, Melbourne.